



SERVICE MANUAL

MODEL: NB2540 (NB2540, S24A1-W)

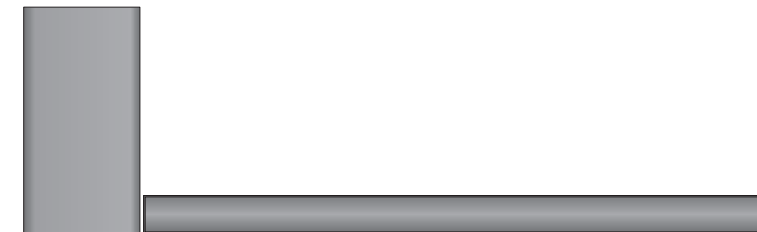
2.1 Channel Powerful Bass Sound Bar

SERVICE MANUAL

MODEL: NB2540
(NB2540, S24A1-W)

CAUTION

BEFORE SERVICING THE UNIT, READ THE "SAFETY PRECAUTIONS"
IN THIS MANUAL.



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SECTION 1

GENERAL

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ESD PRECAUTIONS

Electrostatically Sensitive Devices (ESD)



Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive Devices (ESD). Examples of typical ESD devices are integrated circuits and some field-effect transistors and semiconductor chip components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ESD devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ESD devices.
4. Use only an anti-static solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ESD devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ESD devices.
6. Do not remove a replacement ESD device from its protective package until immediately before you are ready to install it. (Most replacement ESD devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive materials).
7. Immediately before removing the protective material from the leads of a replacement ESD device, touch the protective material to the chassis or circuit assembly into which the device will be installed.

CAUTION : BE SURE NO POWER IS APPLIED TO THE CHASSIS OR CIRCUIT, AND OBSERVE ALL OTHER SAFETY PRECAUTIONS.

8. Minimize bodily motions when handling unpackaged replacement ESD devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ESD device).

CAUTION. GRAPHIC SYMBOLS

	THE LIGHTNING FLASH WITH APOWHEAD SYMBOL. WITHIN AN EQUILATERAL TRIANGLE, IS INTENDED TO ALERT THE SERVICE PERSONNEL TO THE PRESENCE OF UNINSULATED "DANGEROUS VOLTAGE" THAT MAY BE OF SUFFICIENT MAGNITUDE TO CONSTITUTE A RISK OF ELECTRIC SHOCK.
	THE EXCLAMATION POINT WITHIN AN EQUILATERAL TRIANGLE IS INTENDED TO ALERT THE SERVICE PERSONNEL TO THE PRESENCE OF IMPORTANT SAFETY INFORMATION IN SERVICE LITERATURE.

MICOM HIDDEN KEY MODE

HIDDEN MODE	ENTRANCE KEY	EXIT KEY	DISPLAY	RESULT
Version Check (*1)	Front Vol(-) + RMC 'LGTV' for 3s	POWER OFF	M 0000000 E 0000000 T 0000000 Q 0000000 D3F4 00 71 00 00 00 11	1) Micom, 2) ESS 3) Touch Key 4) EQ 5) EQ CheckSum 6) EEPROM option value (on Scroll)
EEPROM INITIAL	Front Vol(-) + RMC '0' for 3s	auto exit	"ECLR"	EEPROM initializing
EEPROM EDIT (*2)	Front Vol(-) + RMC 'OPTICAL' for 3s	Toggling	0xx	Edit Micom option
Clip Off	Front Vol(-) + RMC '8' for 3s	Toggling	"COFF"	To Test (output etc.)
Monitoring Changed Gain at Clip ON	Front Vol(-) + RMC '8' for 3s	Toggling	0000	Monitoring Changed Gain at Clip ON
MAX Value Edit	Front Vol(-) + RMC 'VOL+' for 3s	Toggling	MVxx	For Max Volume setting (1 ~ 100)
USB Fund for Software Update	Front Vol(-) + RMC 'BT' for 3s	Auto exit after update is finished	Refer to "SOFTWARE-UPDATE METHOD" on next page.	

(*1) In Version Check Mode, each time you press the remote control "LGTV" key, it will be changed to the following continuously.

E -> T -> Q -> M -> E.....

(*2) In EEPROM Edit Mode, Front Vol (-) + RMC 'OPTICAL' is pressed again, the EEPROM will be initialized.

FIRMWARE UPGRADE

1. Firmware File

- ① Main MICOM
 - R5F100GEAFB (RENESAS Electronics Co.)
 - Upgrade filename : **MICOM_NB2540xxxxxxxx.HEX**
- ② DSP
 - ES8690DSC (ESS Technology, INC.)
 - Upgrade filename : **DSP_NB2540xxxxxxxx.ROM**
- ③ EQ
 - M24C16 (ST Microelectronics EEPROM)
 - Upgrade filename : **EQ_PRGxxxxxx.BIN**
- ④ Touch Key MICOM
 - TC354K (Core River INC.)
 - Upgrade filename : **TOUCH1_NB2540xxxxxxxx.DLD**

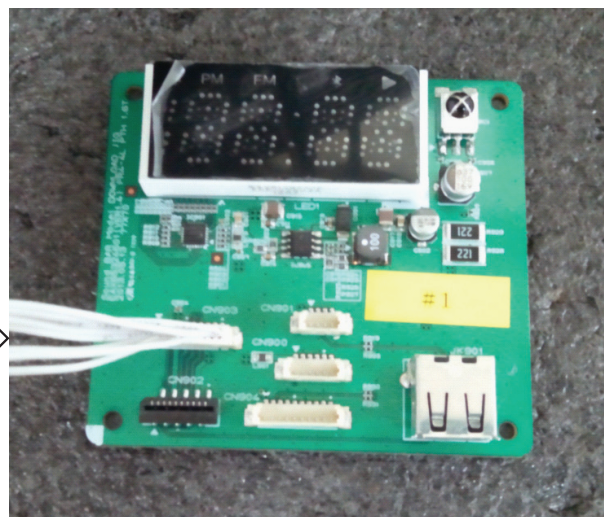
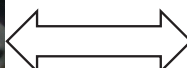
* x : Release date and version.

2. Connecting the Upgrade Jig

- 1) Remove the sticker for service on rear panel.



- 2) Connect the jig board to rear panel by cable.

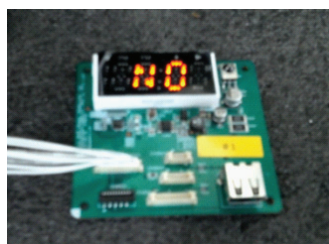


3. How to Upgrade Firmware

- 1) Copy the firmware for upgrade to the USB memory.
- 2) Turn on the SoundBar.
- 3) To move to USB function, press [VOL-] key on front of SoundBar and [BT] key on remote controller for 3 seconds at the same time.
- 4) Insert USB memory that contains the firmware into the USB port of jig.
Upgrade will be start automatically.
Wait until turn off the Soundbar after upgrade.
- 5) Do not turn off the Soundbar during firmware upgrade.



USB function



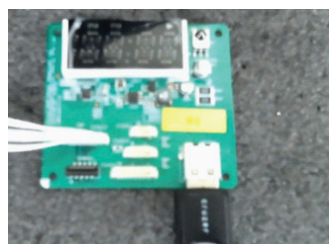
Ready



Memory inserted



DSP upgrade



Power off automatically
after upgrade

SERVICE INFORMATION FOR EEPROM

- **FACTORY RESET:** SET("Vol-" KEY) + REMOTE CONTROL "2"

[AUDIO MICOM OPTION CODE SETTING]

SET("Vol-" KEY) + REMOTE CONTROL "2" (MORE THAN 3 SECONDS) ⇒ CHANGE OPTION CODE WITH THE ARROW KEY (REPEAT, PLAY/PAUSE, SKIP KEY) AND PRESS REMOTE CONTROL STOP KEY ⇒ SET("Vol-" KEY) + REMOTE CONTROL "2" ⇒ COMPLETED.

SPECIFICATIONS

• GENERAL (NB2540)

Power requirements	Refer to the main label on the unit.
Power consumption	Refer to the main label on the unit.
Dimensions (W x H x D)	880 mm x 62 mm x 90 mm (34.7" x 2.44" x 3.54")
Net Weight (Approx.)	1.8 kg (4 lbs)
Operating temperature	41 °F to 95 °F (5 °C to 35 °C)
Operating humidity	5 % to 90 %

• INPUT/OUTPUT

OPT. IN	3 V (p-p), Optical jack x 1
PORT. IN	0.5 Vrms (3.5 mm stereo jack) x 1
Available Digital Input Audio Sampling Frequency	32 kHz, 44.1 kHz, 48 kHz, 96 kHz

• AMPLIFIER

Total	120 W
Front	25 W x 2 (4 Ω at 1 kHz)
Subwoofer	70 W (4 Ω at 100 Hz)
THD	10 %

• SUBWOOFER (S24A1-W)

Type	1 Way 1 Speaker
Impedance	4 Ω
Rated Input Power	70 W
Max. Input Power	140 W
Dimensions (W x H x D)	156 mm x 300 mm x 294 mm (6.1" x 11.8" x 9.8")
Net Weight (Approx.)	2.9 kg (6.4 lbs)

- Designs and specifications are subject to change without prior notice.

SECTION 2

CABINET & MAIN CHASSIS

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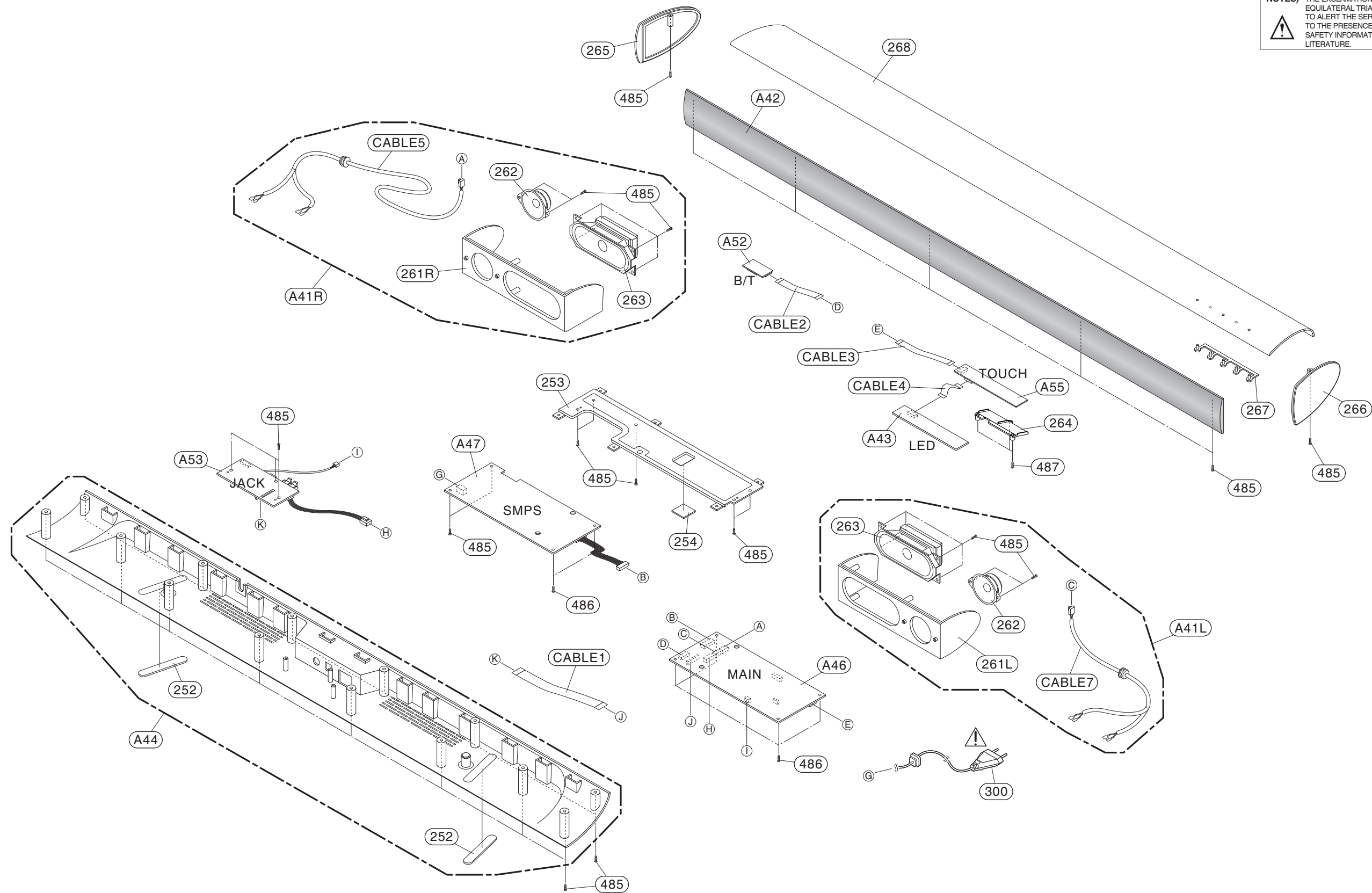
MEMO

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EXPLODED VIEWS

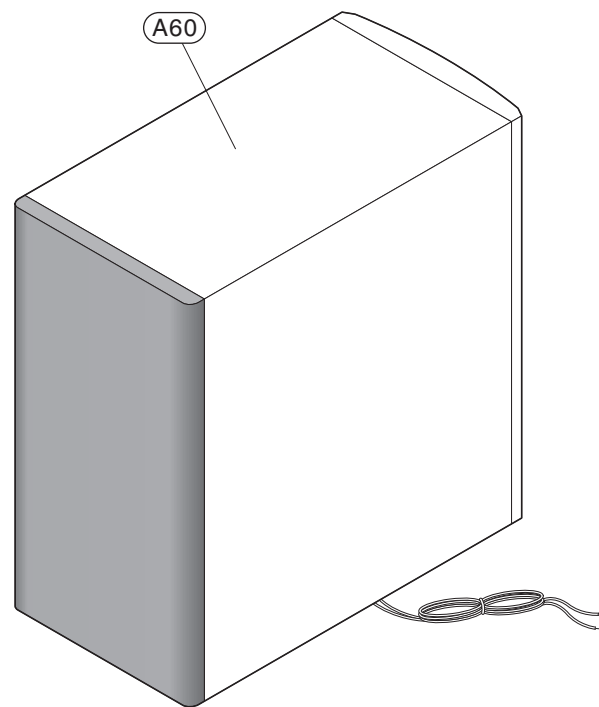
1. CABINET AND MAIN FRAME SECTION (NB2540)

NOTES) THE EXCLAMATION POINT WITHIN AN EQUILATERAL TRIANGLE IS INTENDED TO ALERT THE SERVICE PERSONNEL TO THE PRESENCE OF IMPORTANT SAFETY INFORMATION IN SERVICE LITERATURE.

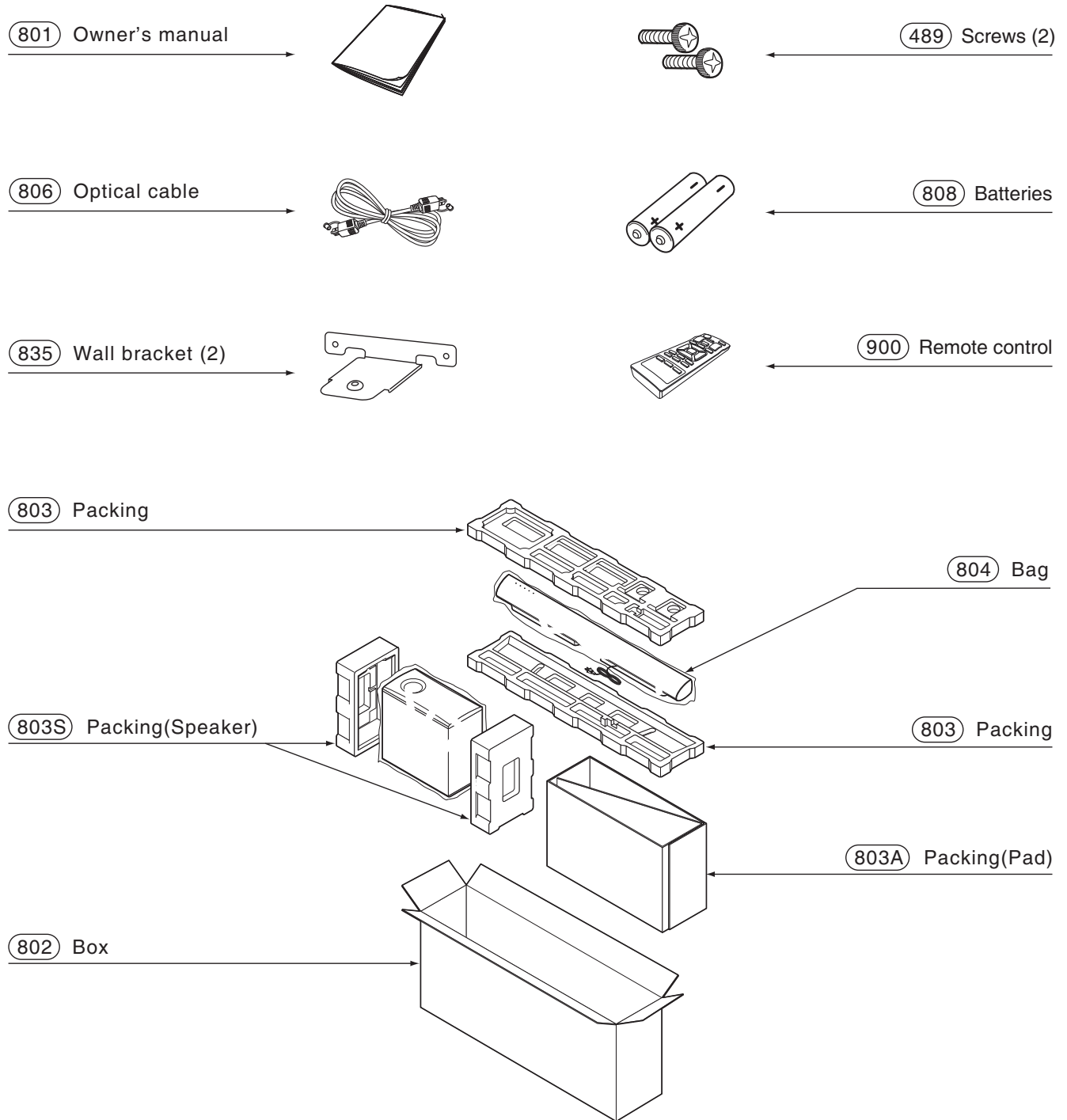


2. SUBWOOFER SECTION (S24A1-W)

MEMO

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3. PACKING ACCESSORY SECTION



MEMO

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

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ONE POINT REPAIR GUIDE

1. NO POWER PROBLEM

No power problem occurs when you power on the unit.

1-1. 28.5 VA

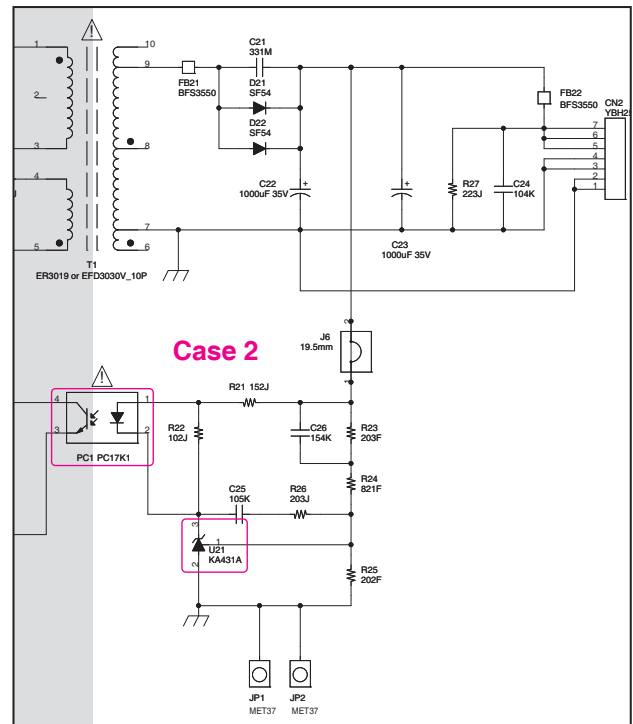
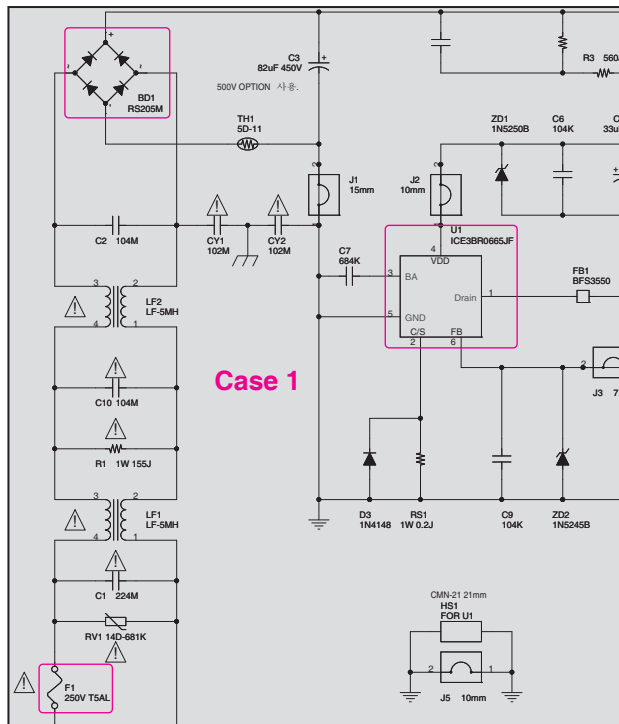
1-1-1. Solution

Replace F1, BD1, U1, PC1, U21.

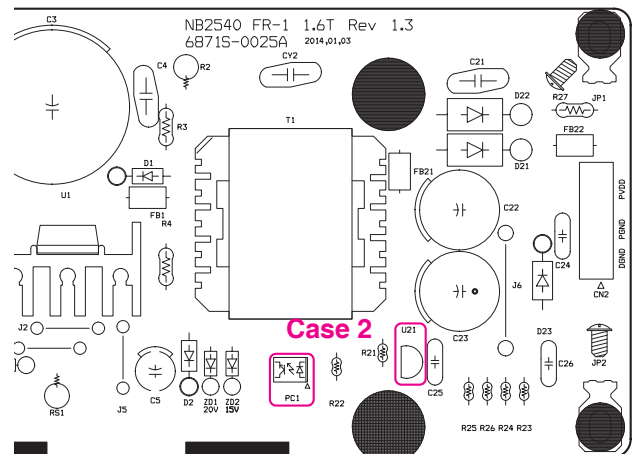
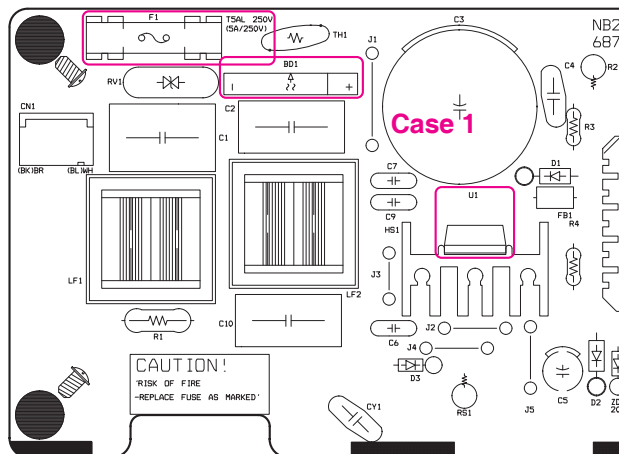
1-1-2. How to troubleshoot (Countermeasure)

Case 1) No standby LED: Check F1, BD1, U1 and around components. ⇒ Replace these.

Case 2) 28.5 VA abnormal: Check PC1, U21. ⇒ Replace these.



1-1-3. Service hint (Any picture / Remark)



< SMPS board top view >

ONE POINT REPAIR GUIDE

2. POWER ON ERROR

No function LED or Not working.

2-1. IC801, IC301

2-1-1. Solution

Replace IC801 or IC301.

2-1-2. How to troubleshoot (Countermeasure)

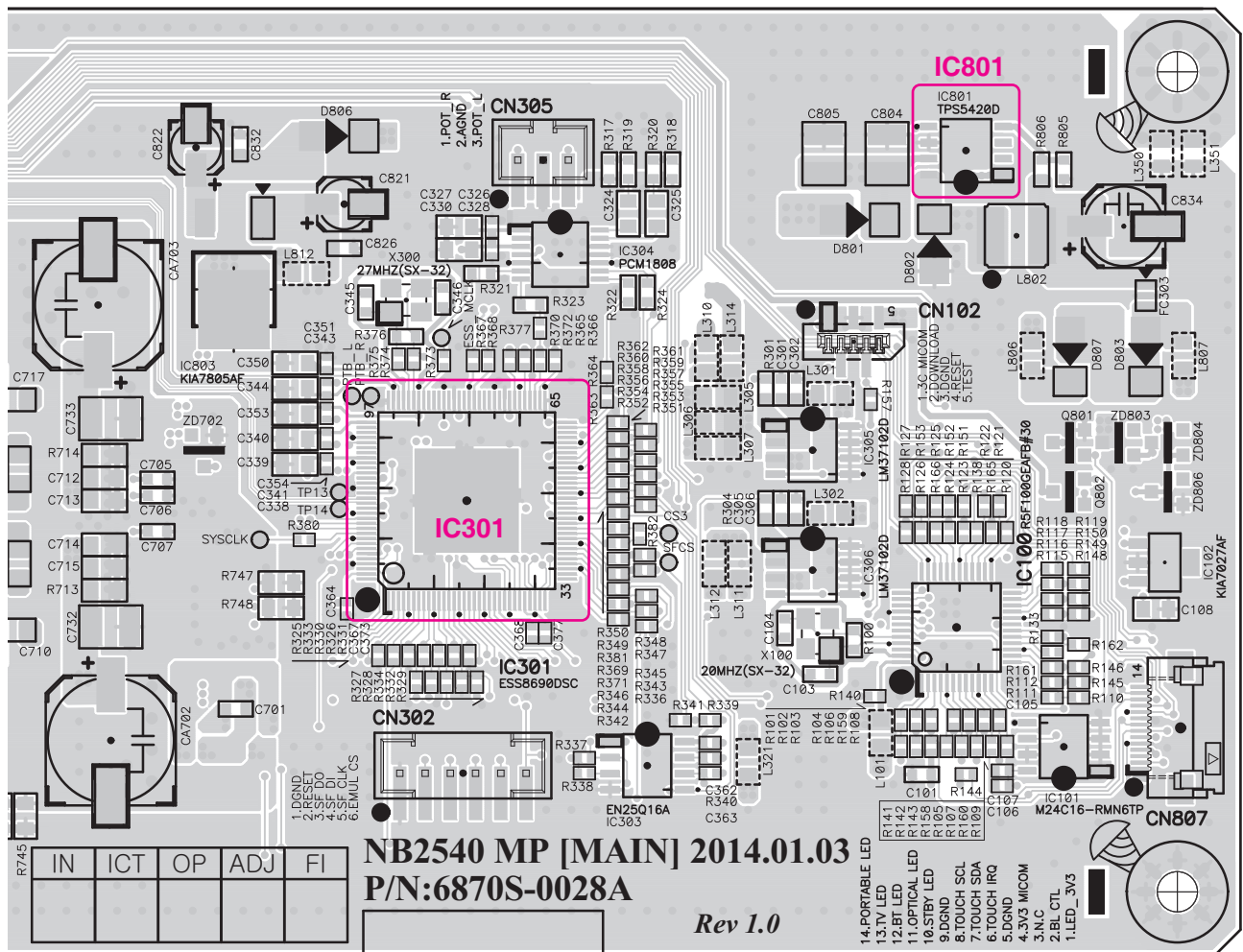
1) Please check IC801 voltage (3V3_MICOM).

Please check IC301 voltage (3.3 V).

2) If you cannot get 3V3_MICOM, IC801 has problem.

If 3.3V_PWR_CTRL pin is OK (High) and you cannot get 3.3 V then IC301 has problem.

2-1-3. Service hint (Any picture / Remark)



< Main board top view >

ONE POINT REPAIR GUIDE

NO SOUND

3-2. Optical Function

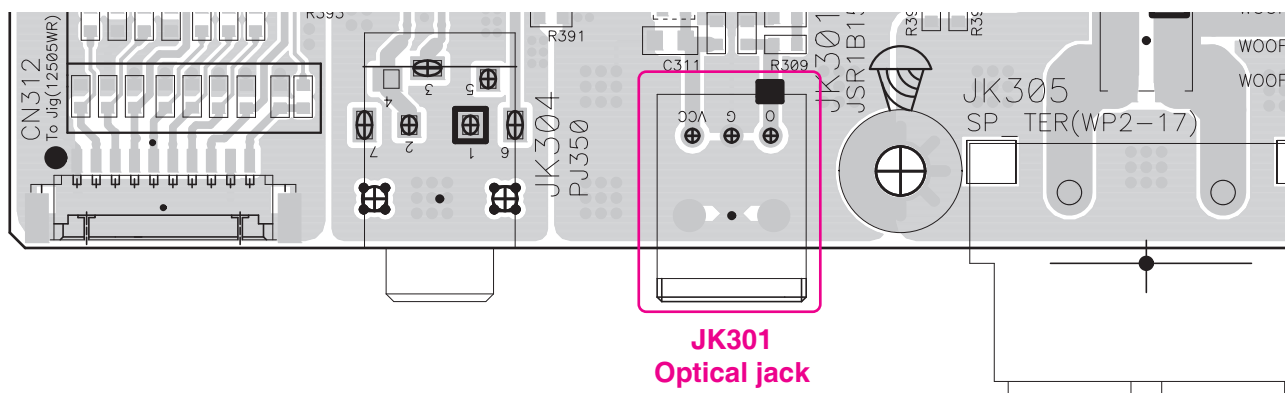
3-2-1. Solution

Replace IC301 or optical jack.

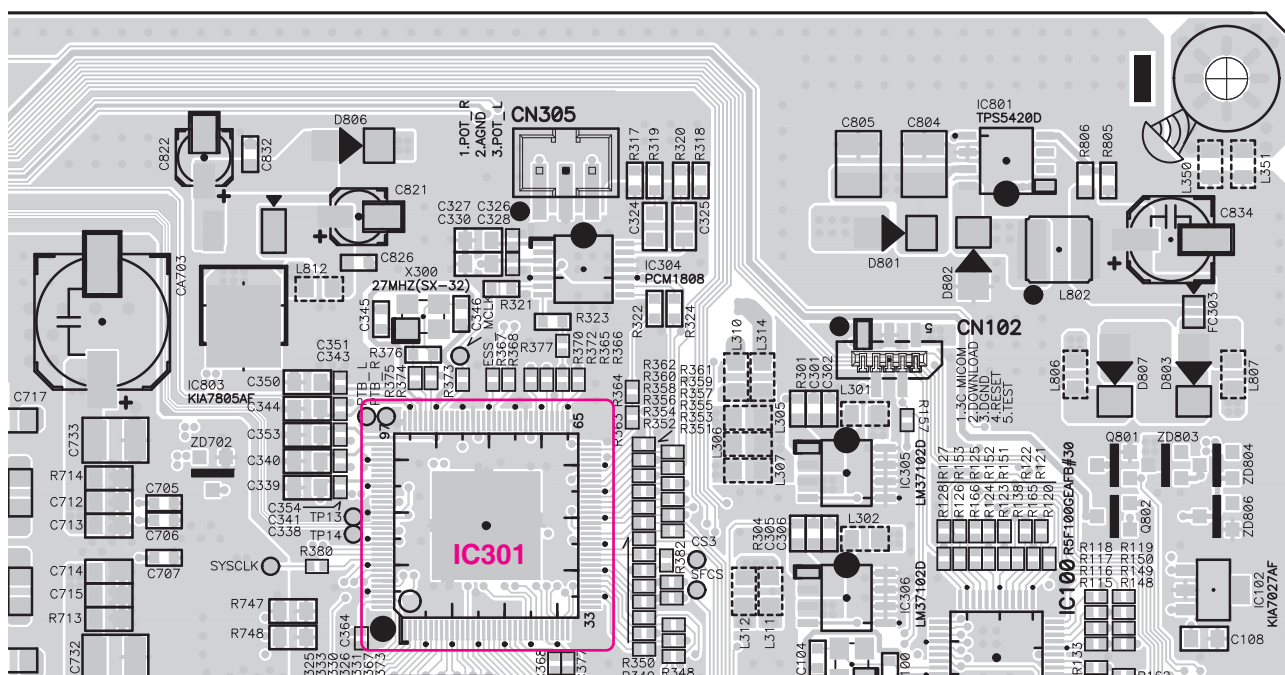
3-2-2. How to troubleshoot (Countermeasure)

- 1) Please check optical input.
Please check DSP input (Pin94 - SPDIF signal).
- 2) If you cannot find optical jack outout SPDIF signal, replace optical jack.
If you cannot find DSP input SPDIF signal, replace IC301.

3-2-3. Service hint (Any picture / Remark)



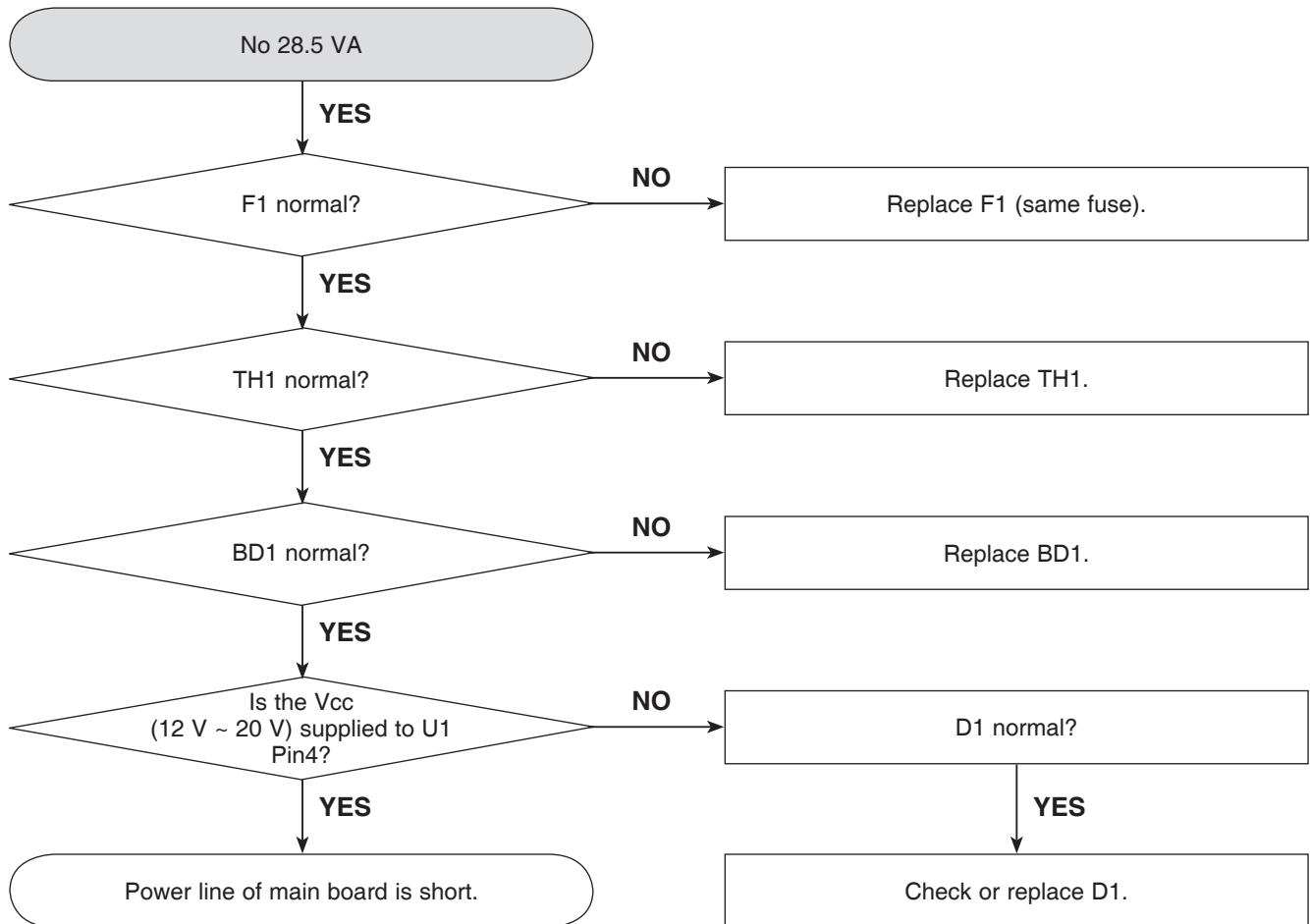
< Jack board top view >



< Main board top view >

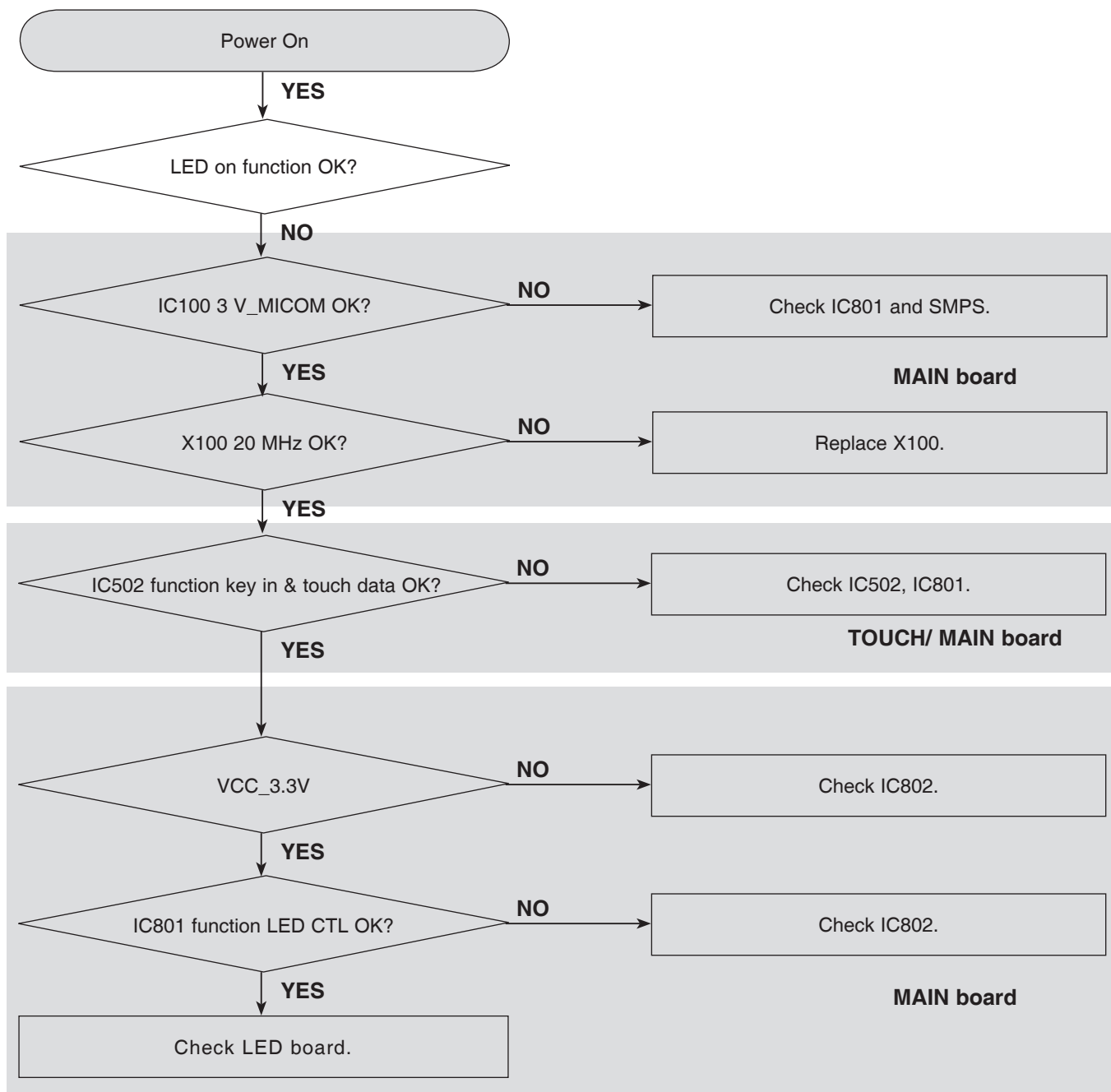
ELECTRICAL TROUBLESHOOTING GUIDE

1. POWER SUPPLY ON SMPS BOARD



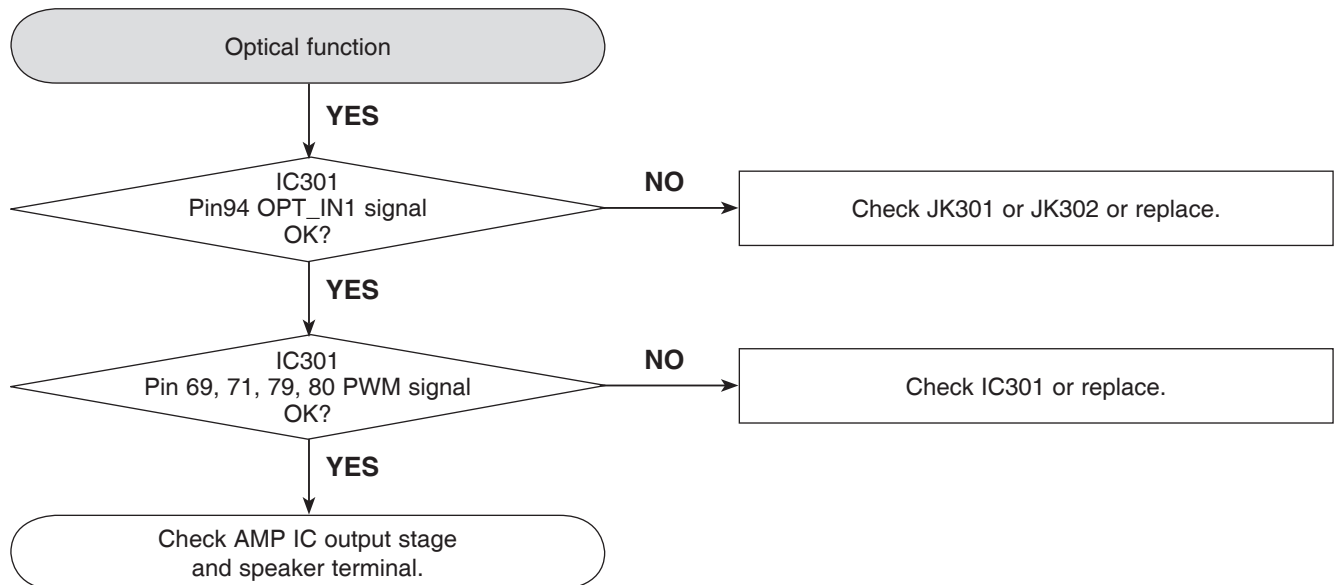
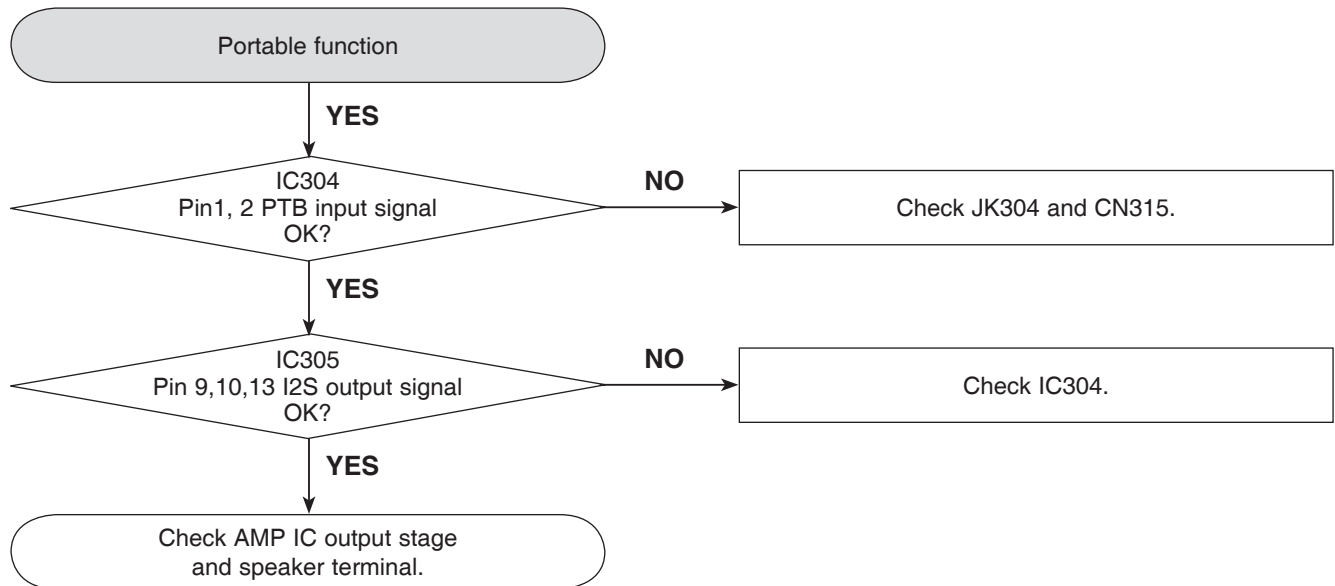
ELECTRICAL TROUBLESHOOTING GUIDE

2. SYSTEM PART



ELECTRICAL TROUBLESHOOTING GUIDE

3. NO AUDIO OUTPUT



DETAILS AND WAVEFORMS ON SYSTEM TEST AND DEBUGGING

1. SYSTEM PART-1 (X-TAL)

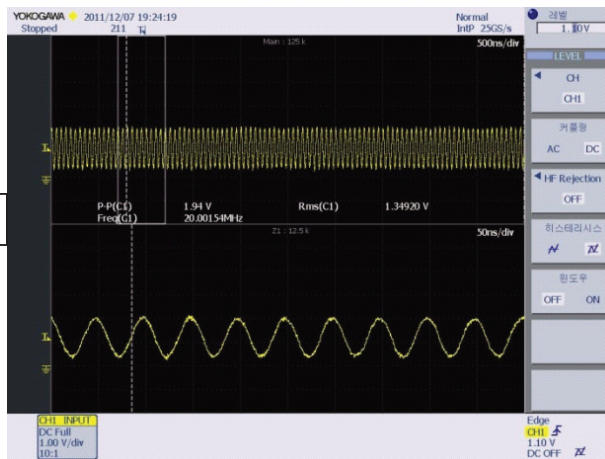
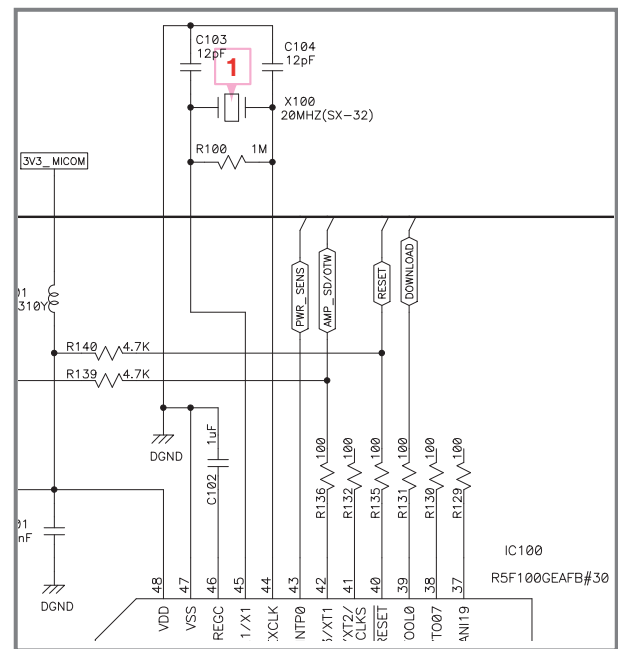


FIG 1-1



MICOM (IC100) - R5F100GEAFB#30

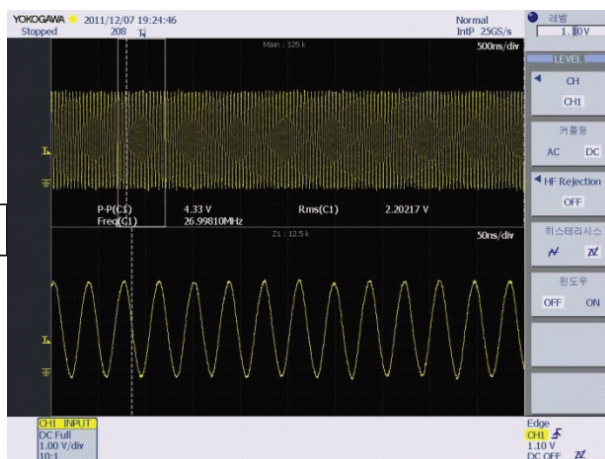
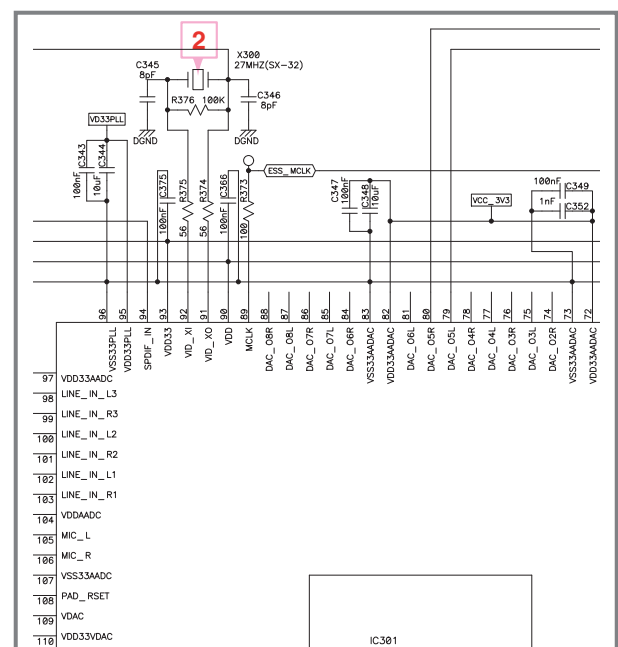


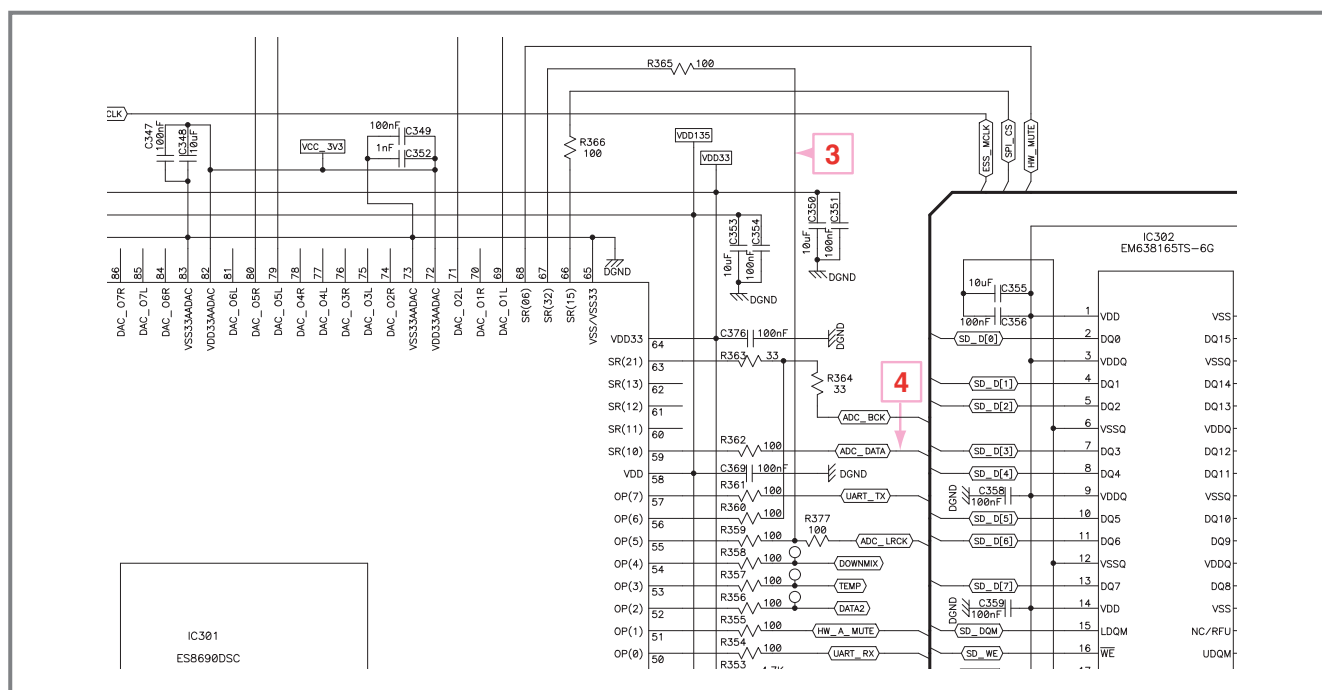
FIG 1-2



2. SYSTEM PART-2 (I2S SIGNAL)



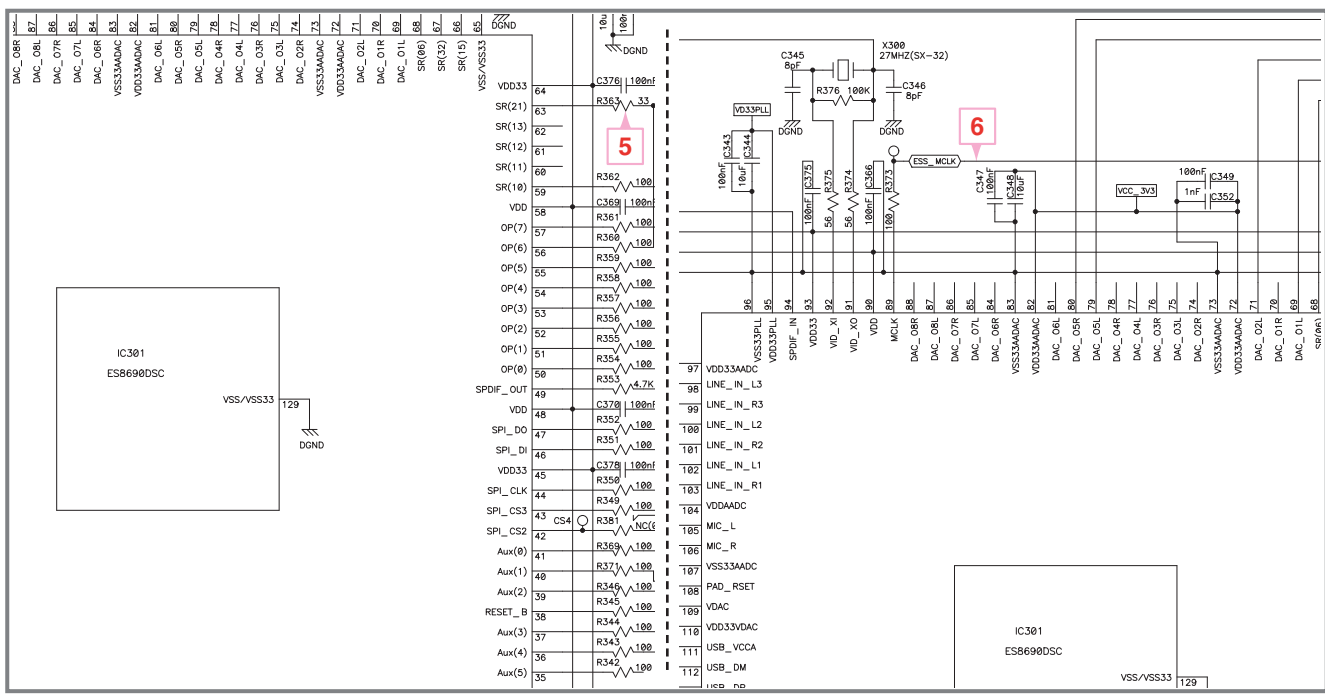
FIG 2-1



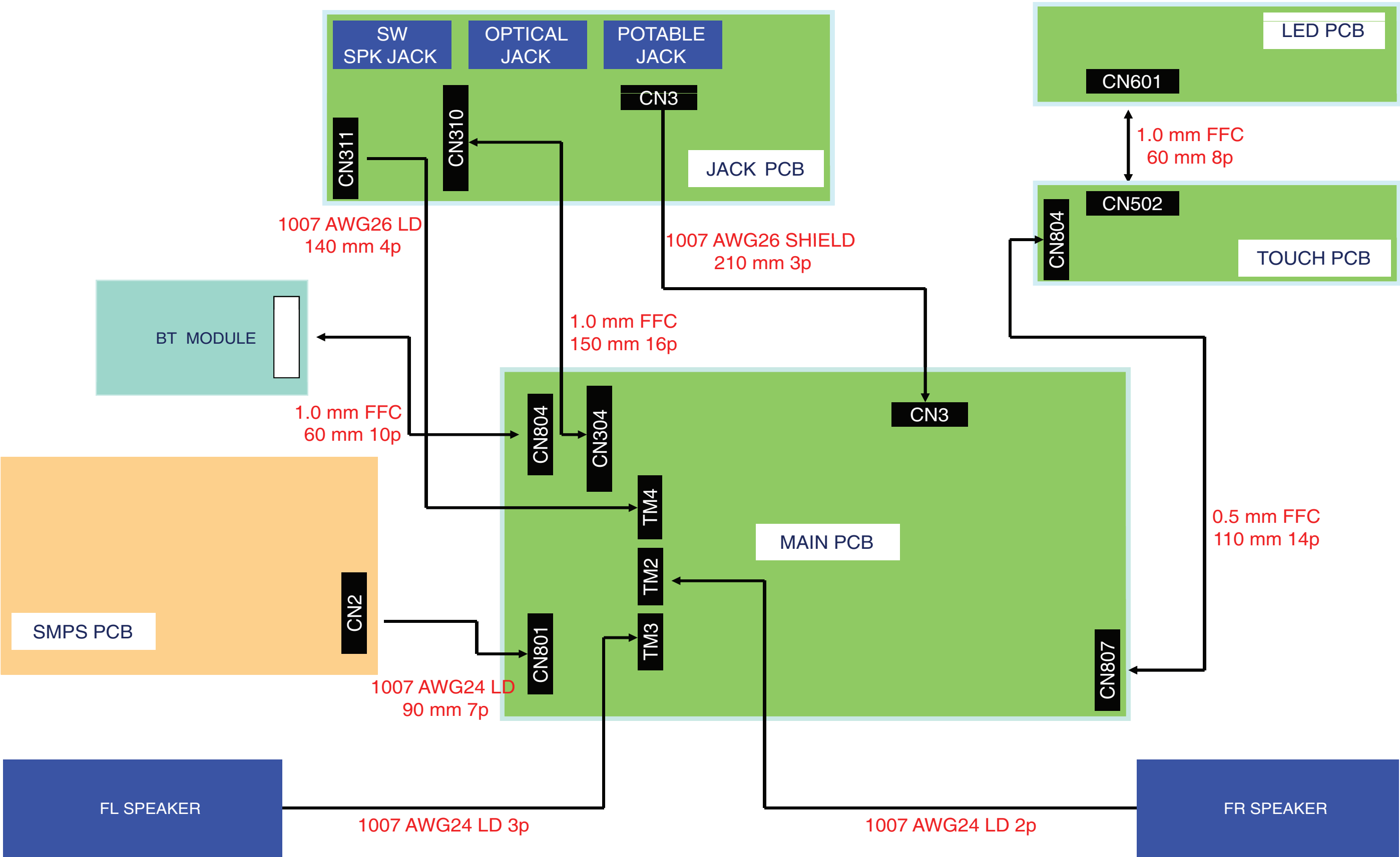
DSP (IC301) - ES8690



FIG 2-2

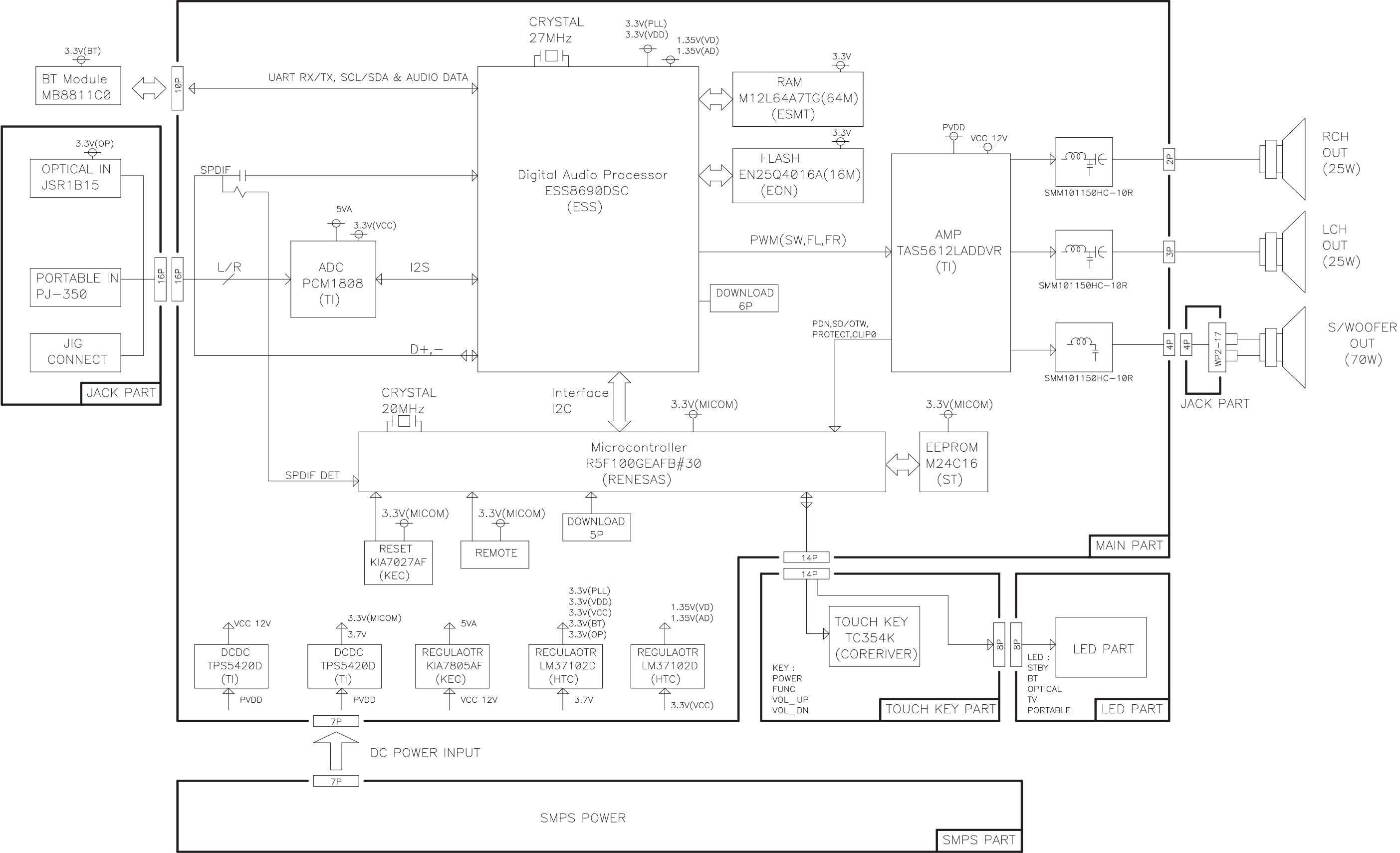


WIRING DIAGRAM

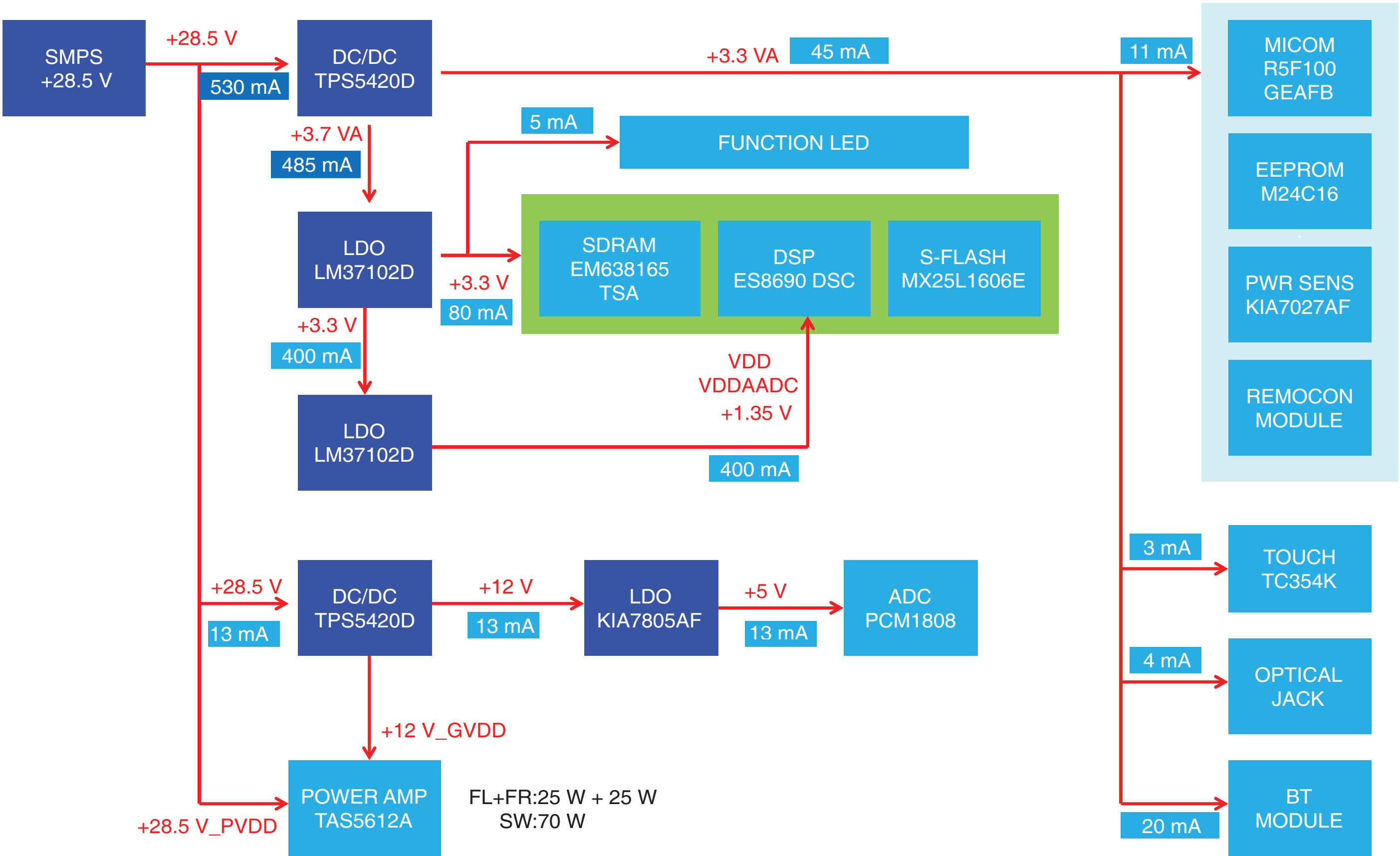


BLOCK DIAGRAMS

1. SYSTEM BLOCK DIAGRAM

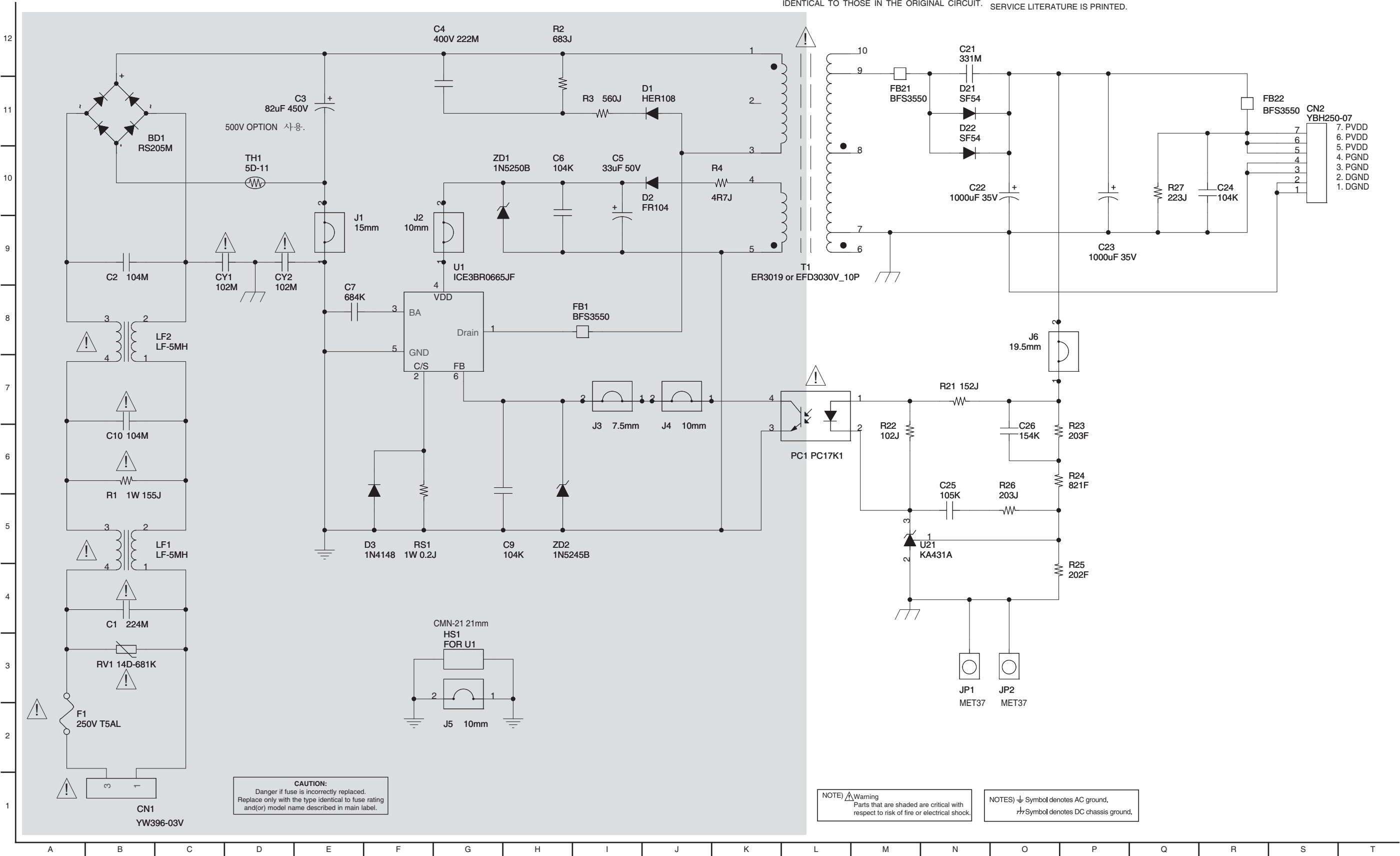


2. POWER BLOCK DIAGRAM

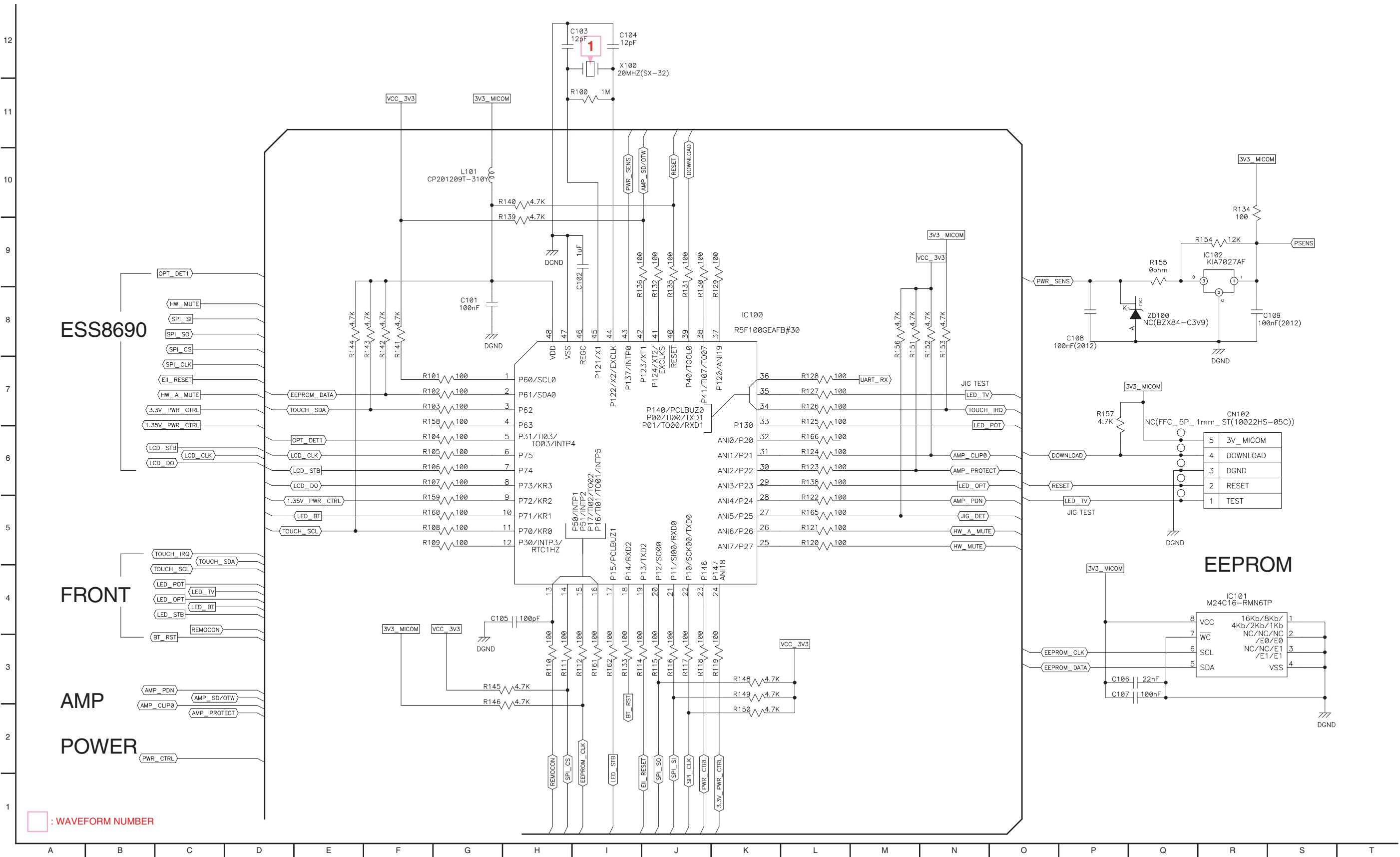


CIRCUIT DIAGRAMS

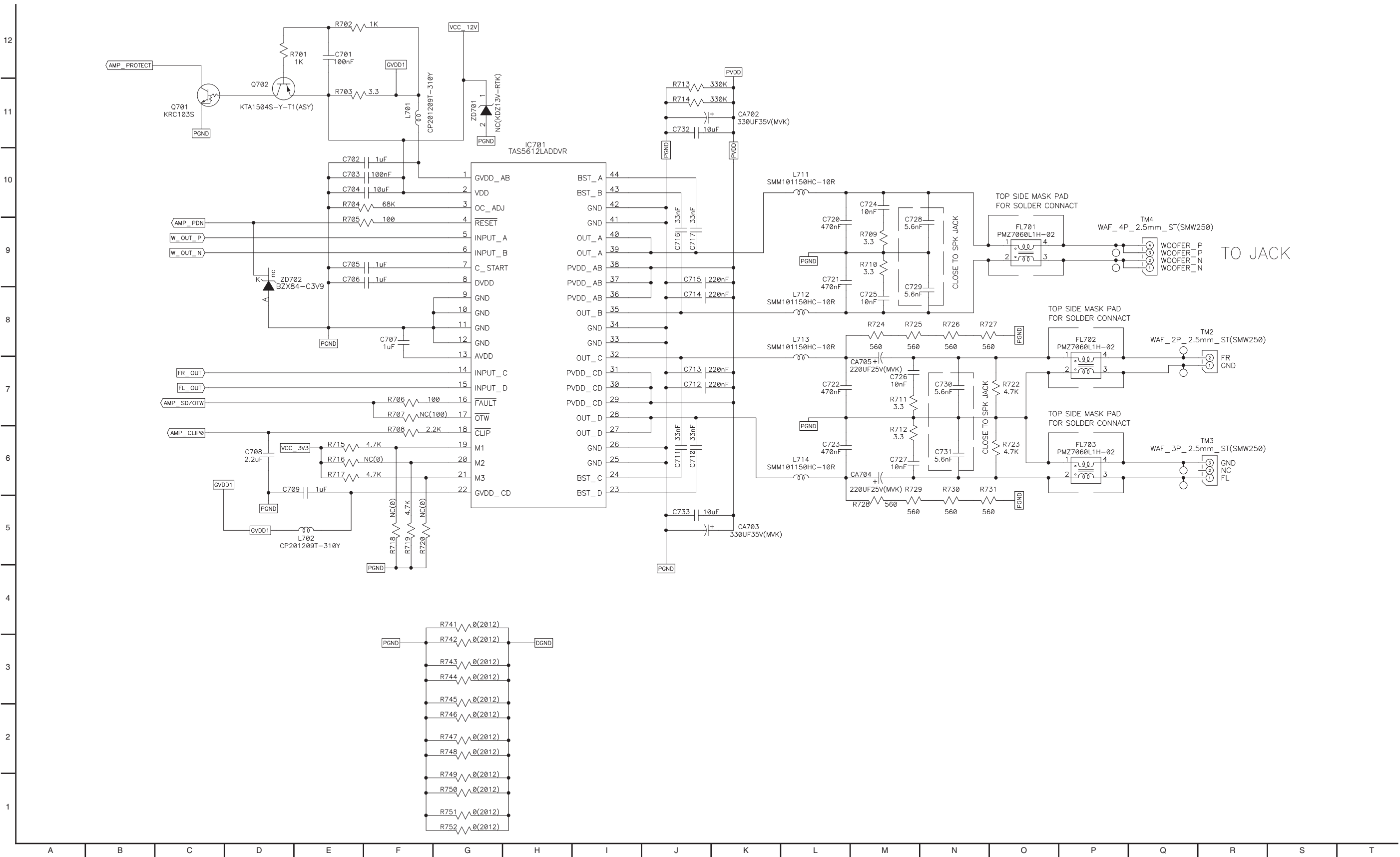
1. SMPS CIRCUIT DIAGRAM



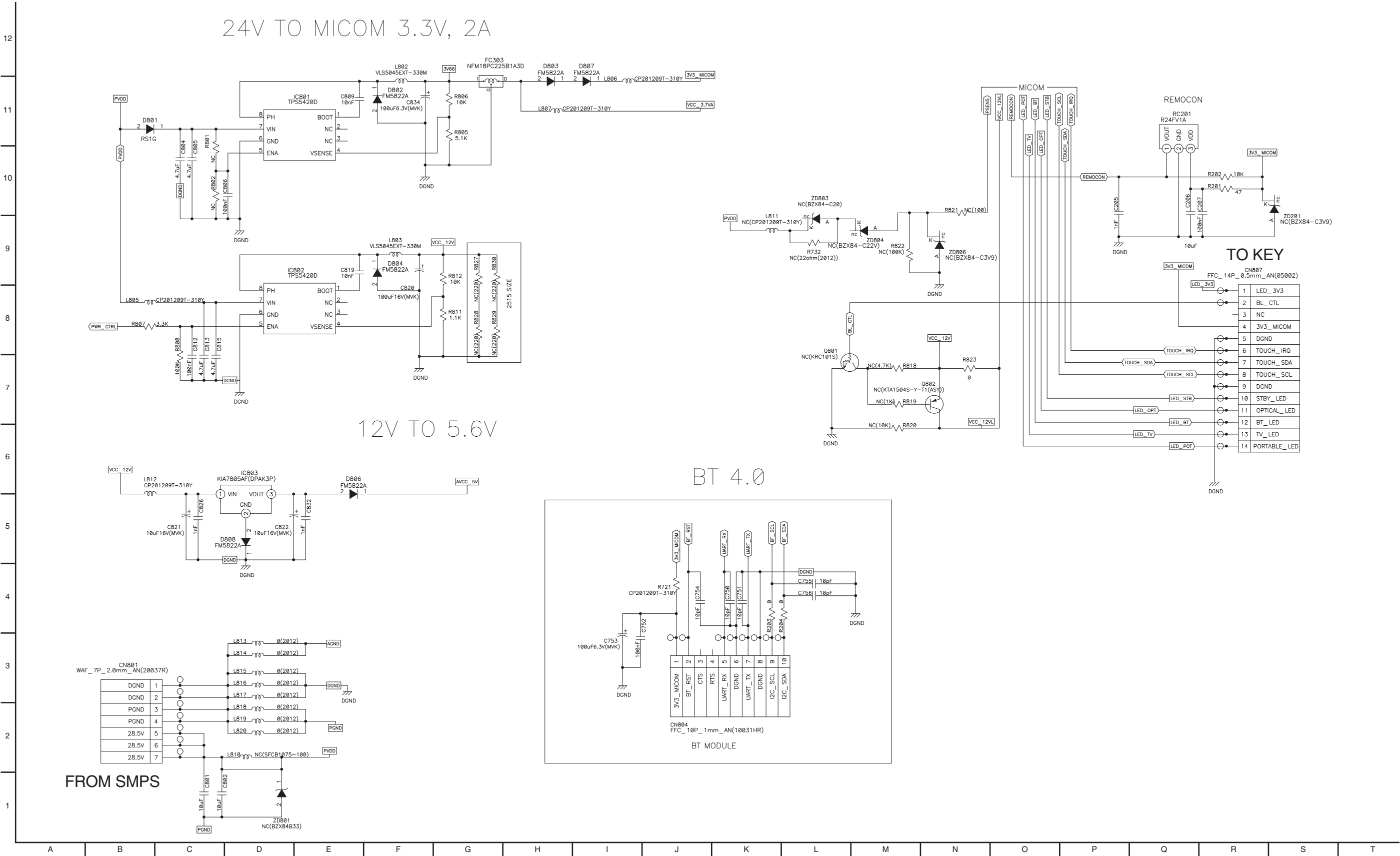
2. MAIN - MICOM CIRCUIT DIAGRAM



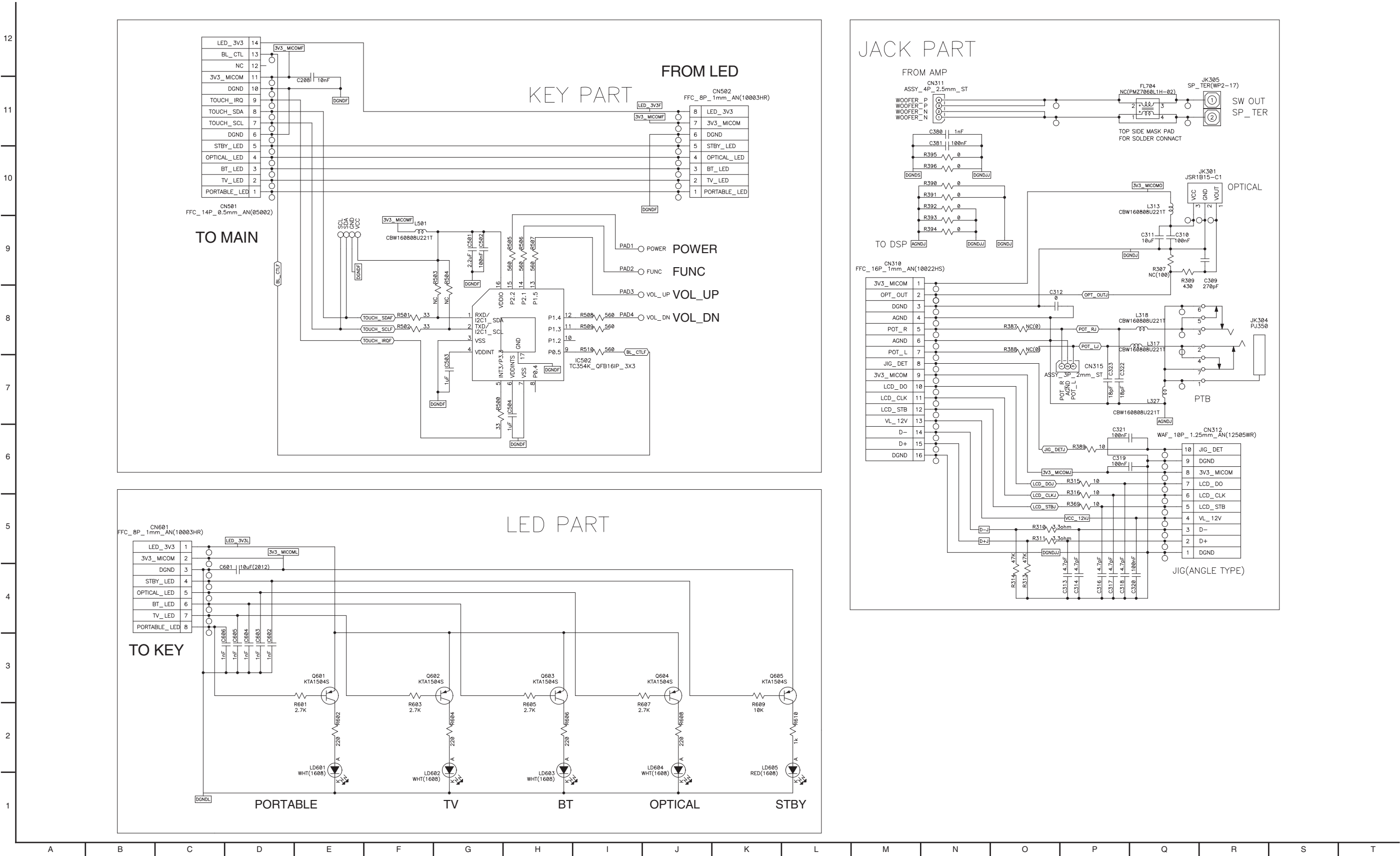
4. MAIN - AMP CIRCUIT DIAGRAM



5. MAIN - POWER CIRCUIT DIAGRAM



6. KEY/ JACK/ LED CIRCUIT DIAGRAM



CIRCUIT VOLTAGE CHART

1. ICs

LOCATION	NAME	DIVISION	PIN NUMBER	SPEC.	ENG. VOLTAGE	REAL VOLTAGE
MAIN Board						
IC100	IC, Microcontrollers	3V_MICOM	48 PIN	1.8~5.5V	3.30	3.13
IC101	IC, EEPROM	3V_MICOM	8 PIN	1.8~5.5V	3.30	3.13
IC301	IC, MPEG	VCC33_USB	111 PIN	3.3V ±5%	3.30	3.21
		VD33VDAC	110 PIN	3.3V ±5%	3.30	3.21
		VDD135AADC	104 PIN	1.35V ±5%	1.35	1.34
		VC33AADC	97 PIN	3.3V ±5%	3.30	3.21
		VD33PLL	95 PIN	3.3V ±5%	3.30	3.21
		VD33ADAC	73, 82 PIN	3.3V ±5%	3.30	3.21
		VDD135	12, 23, 48, 58, 90, 114, 127 PIN	1.35V ±5%	1.35	1.34
		VDD33	14, 28, 45, 64, 93, 115 PIN	3.3V ±5%	3.30	3.21
IC302	IC, SDRAM	VDD33	1, 3, 9, 14, 27, 43, 49 PIN	3V~3.6V	3.30	3.21
IC303	IC, Serial Flash Memory	VDD33	8 PIN	3.3V	3.30	3.21
IC304	IC, A/D Converter	AVCC_5V	3 PIN	0~6.5V	5.00	5.21
		VCC_3V3	4 PIN	0~4.0V	3.30	3.21
IC701	IC, Audio Amplifier	VCC_12V	2 PIN	-0.3~13V	12V	12.260
		GVDD1	1, 22	-0.3~13V	12V	12.260
		PVDD	29, 30, 31, 36, 37, 38	-0.3~50V	28.5	28.45
IC801	IC, DC, DC Converter	PVDD_28.5VA	7 PIN	5.2~36V	28.5	28.45
		VCC_3.7VA	8 PIN	3.5~28V	3.7	3.58
IC802	IC, DC, DC Converter	PVDD_28.5VA	7 PIN	5.2~36V	28.5	28.45
		VCC_12V	8 PIN	4.5~28V	12.00	12.26
IC803	IC, LDO Voltage Regulator	VCC_12V	1 PIN	7~35V	12	12.26
		VCC_5V	3 PIN	4.75~5.25V	5.00	5.21
IC805	IC, LDO Voltage Regulator	3V3	2 PIN	2.25~16V	3.30	3.21
		VDD135	3 PIN	2.25~16V	1.35	1.34
FRONT Board						
IC502	IC, Capacitive Touch Sensor	3V_MICOM	24 PIN	1.71 ~ 5.5V	3.30	3.13

2. COILS

Location	Description	Before	After	Current	Difference
MAIN Board					
L101	CP201209T-301Y 300ohm 2A	3.13	3.13	0.018	0
L301	CP201209T-301Y 300ohm 2A	3.58	3.58	0.485	0
L302	CP201209T-301Y 300ohm 2A	3.21	3.21	0.41	0
L305	CP201209T-301Y 300ohm 2A	GND	GND	-	-
L306	CP201209T-301Y 300ohm 2A	5.21	5.21	0.017	0
L307	CP201209T-301Y 300ohm 2A	3.21	3.21	0.41	-
L308	CP201209T-301Y 300ohm 2A	3.323	3.323	0.011	0
L311	CP201209T-301Y 300ohm 2A	1.34	1.34	0.395	0
L312	CP201209T-301Y 300ohm 2A	1.34	1.34	0.0041	0
L313	CBW160808U221T 220ohm 1A	3.13	3.13	0.0038	0
L314	CBW160808U221T 220ohm 1A	3.21	3.21	0.005	0
L317	CBW160808U221T 220ohm 1A	Signal	Signal	-	-
L318	CBW160808U221T 220ohm 1A	Signal	Signal	-	-
L327	CBW160808U221T 220ohm 1A	Portable Jack GND	Portable Jack GND	-	-
L501	CBW160808U221T 220ohm 1A	3.13	3.13	0.0026	0
L701	CP201209T-301Y 300ohm 2A	12.26	12.26	0.040	0
L702	CP201209T-301Y 300ohm 2A	12.26	12.26	0.040	0
L805	CP201209T-301Y 300ohm 2A	28.45	28.45	0.047	0
L806	CP201209T-301Y 300ohm 2A	3.13	3.13	0.018	0
L807	CP201209T-301Y 300ohm 2A	3.58	3.58	0.485	0.002
L812	CP201209T-301Y 300ohm 2A	12.26	12.26	0.013	0

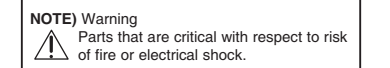
3. CAPACITORS

LOCATION	SPEC	REAL VOLTAGE
SMPS Board		
C3	100uF/450V HE105°C	340
C5	33uF/50V SD 85°C	20
C22	1000uF/35V SD 85°C	28.45
C23	1000uF/35V SD 85°C	28.45
MAIN Board		
CA702	330uF/35V 105°C 20%	28.45
CA703	330uF/35V 105°C 20%	28.45
CA704	220uF/25V 105°C 20%	14.07
CA705	220uF/25V 105°C 20%	14.07
C753	100uF/6.3V 105°C 20%	3.3
C820	100uF/16V 105°C 20%	12.26
C820	10uF/16V 105°C 20%	12.26
C822	10uF/16V 105°C 20%	5.21
C834	100uF/6.3V 105°C 20%	3.58

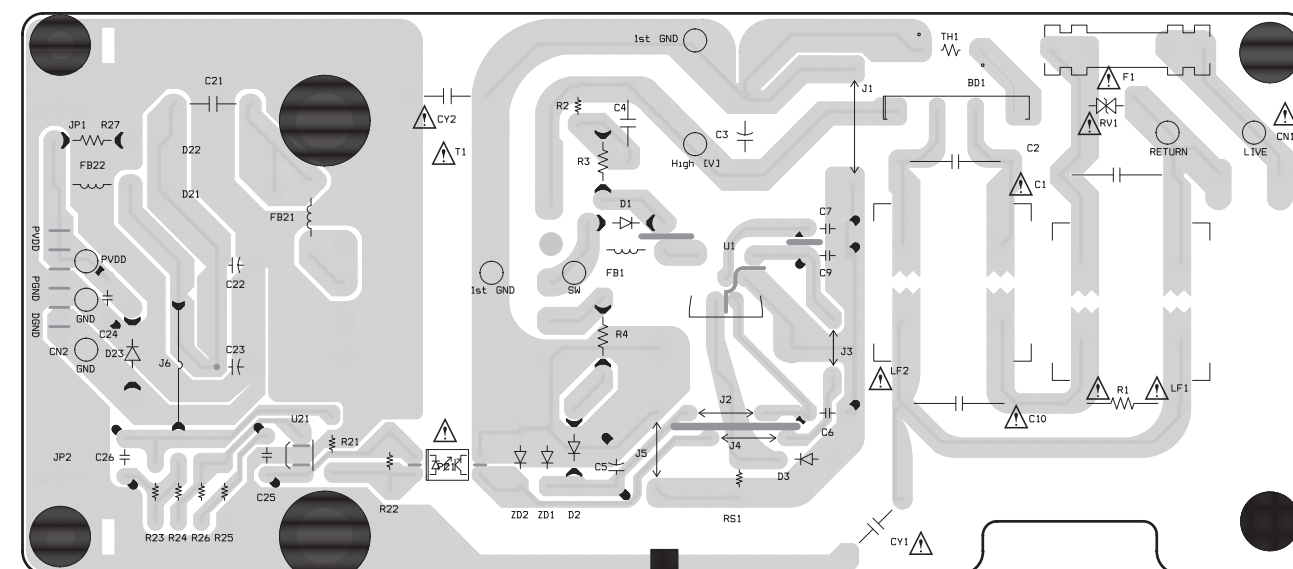
4. CONNECTORS

LOCATION	PIN NUMBER	SPEC	REAL VOLTAGE
MAIN Board			
CN304(JACK)	1, 14	DGND	0
	4	VCC_12V	12.26
	8, 16	3V3_MICOM	3.13
	11	AGND	0
CN801(SMPS)	1, 2, 3	GND	0
	4, 5, 6, 7	PVDD	28.45
CN804(BT)	1	3V3_MICOM	3.13
	6, 8	DGND	0
CN807(KEY)	1	LED_3V3	3.13
	4	3V3_MICOM	3.13
	5, 9	DGND	0
TOUCH Board			
CN312(TOUCH)	1, 9	DGND	0
	4	VCC_12V	12.26
	8	3V3_MICOM	3.13

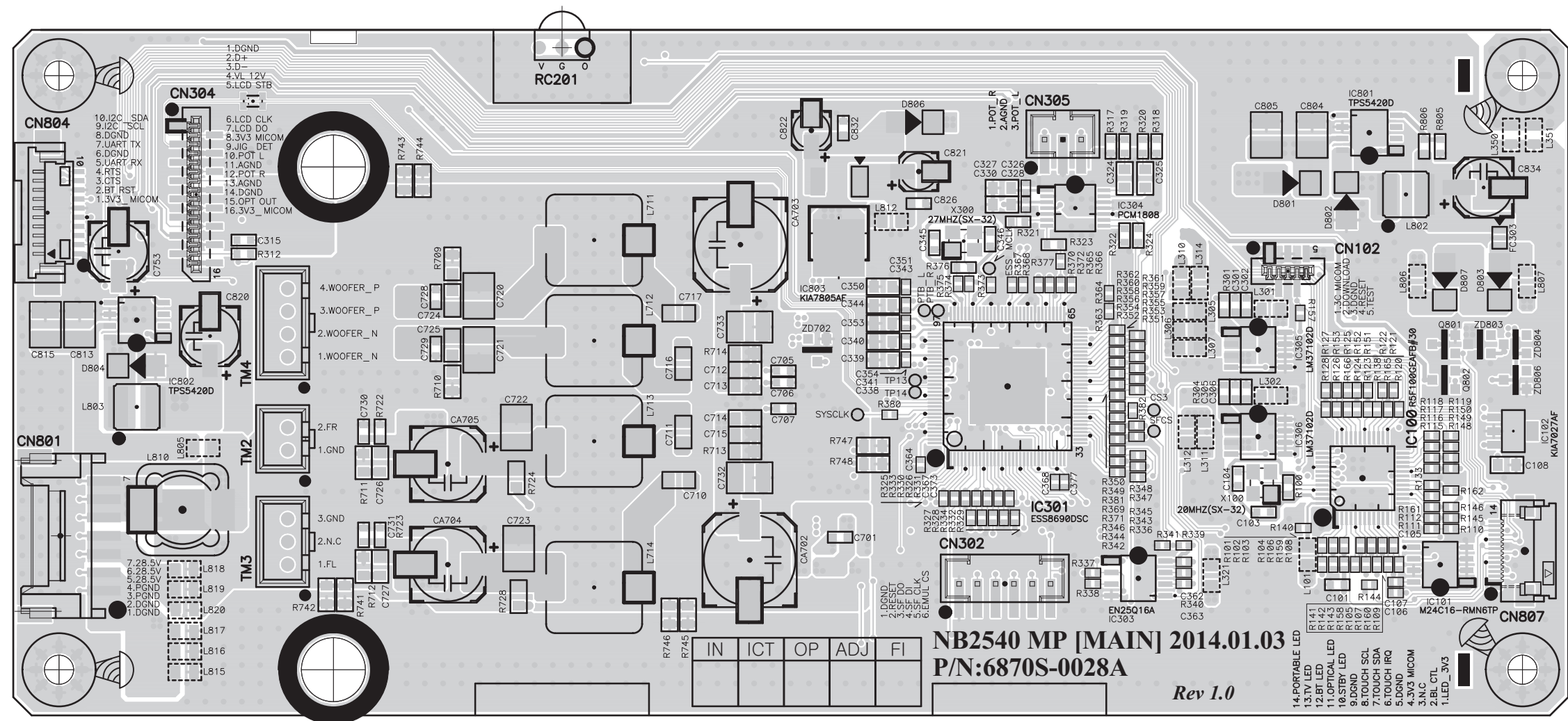
(TOP VIEW)



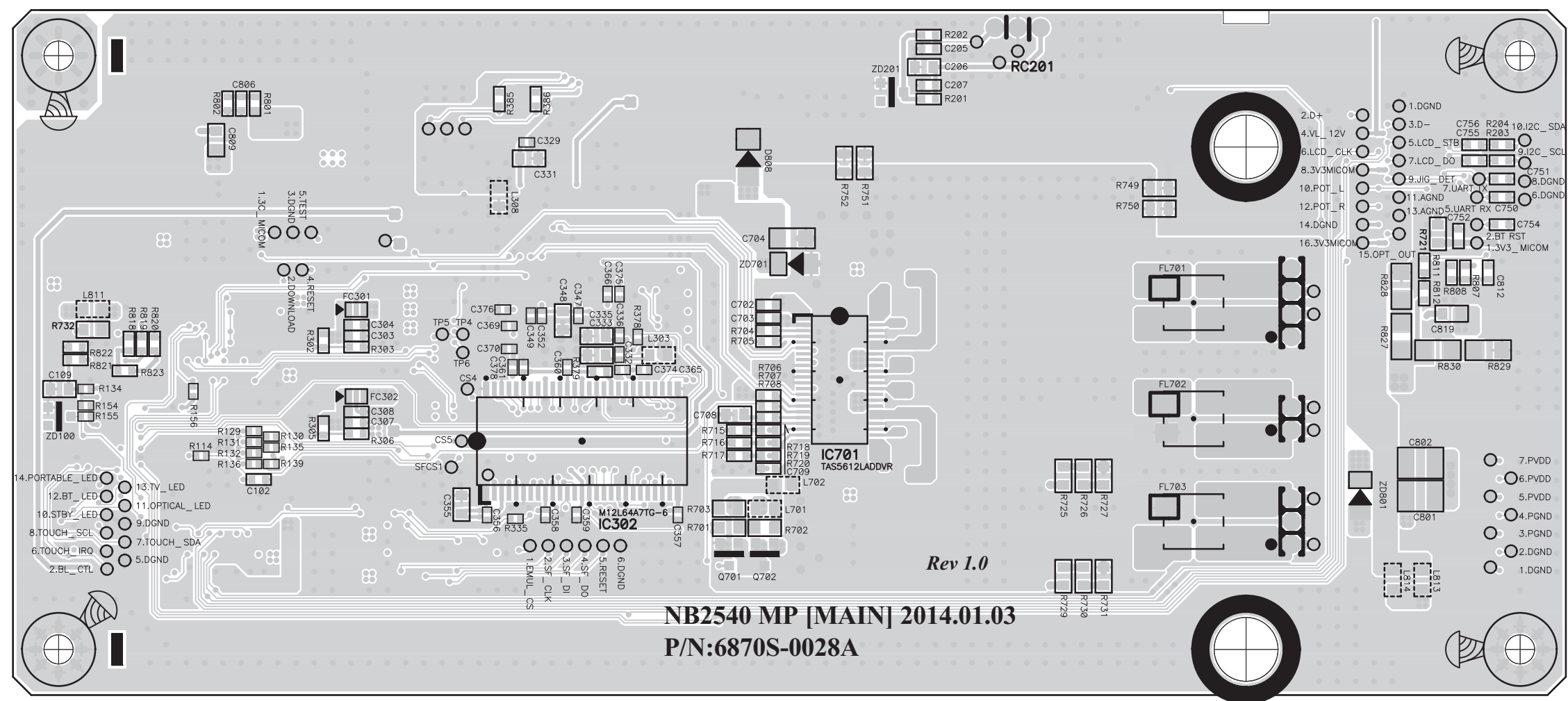
(BOTTOM VIEW)



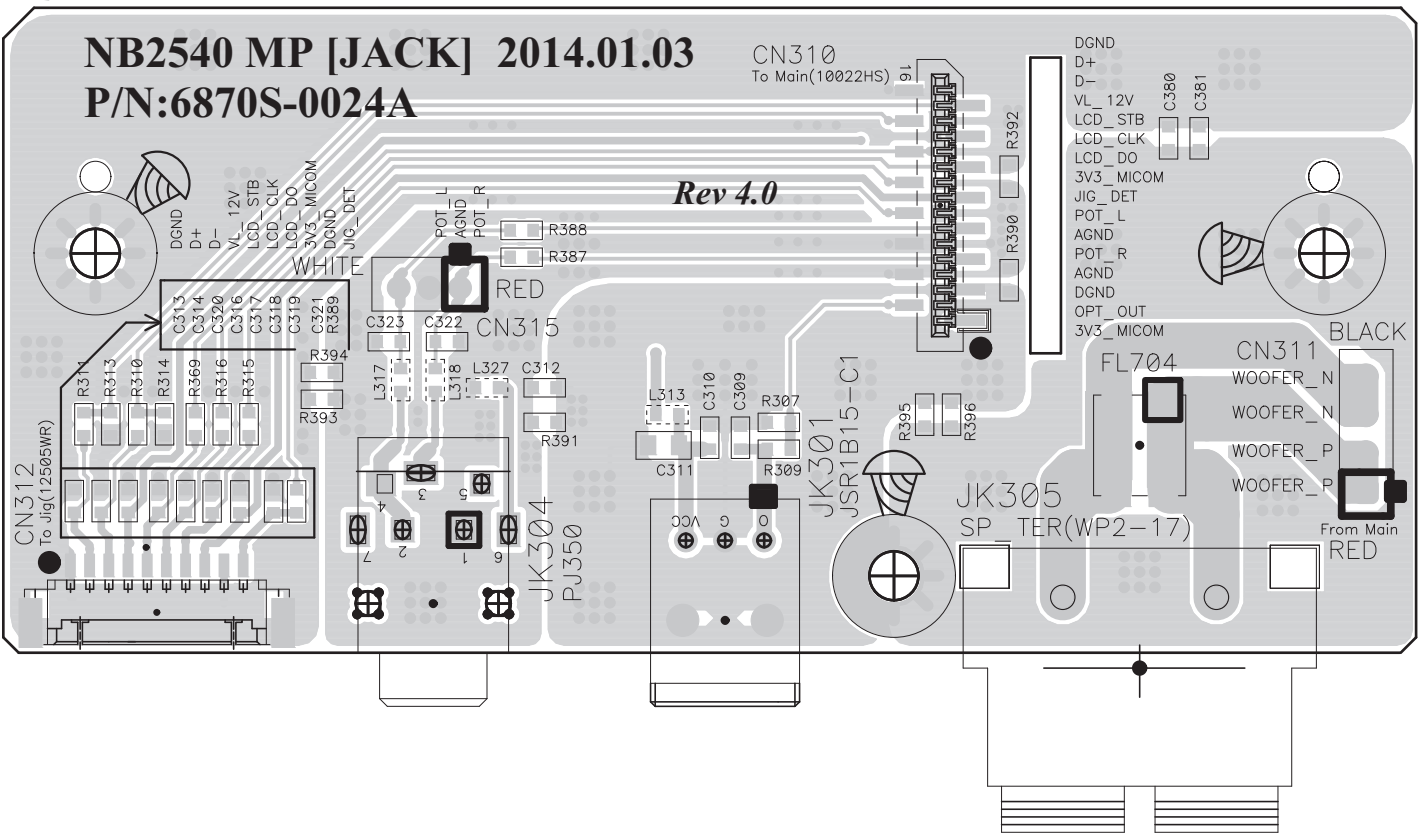
2. MAIN P. C. BOARD



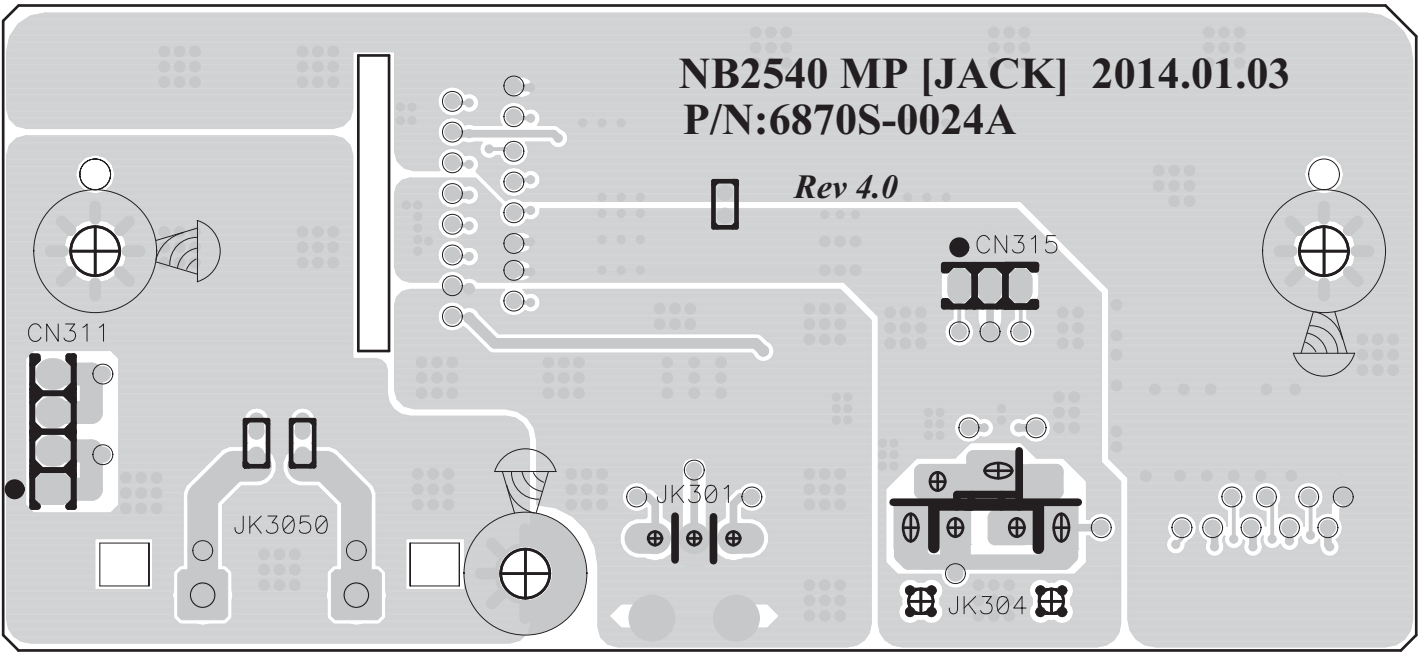
MAIN P. C. BOARD
(BOTTOM VIEW)



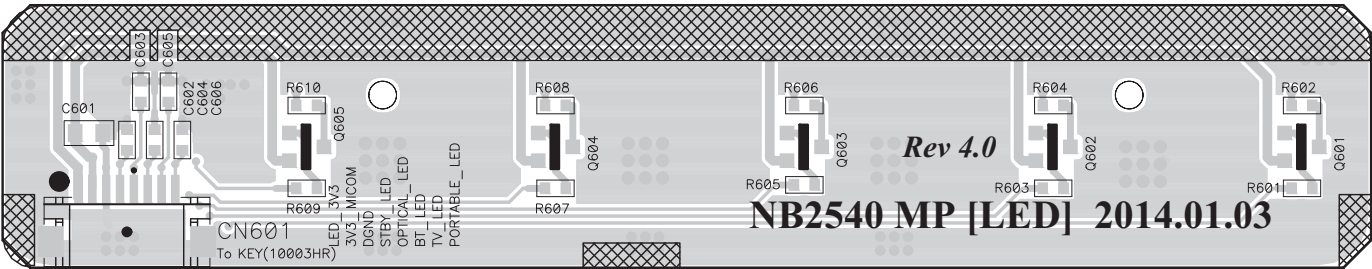
3. JACK P. C. BOARD
(TOP VIEW)



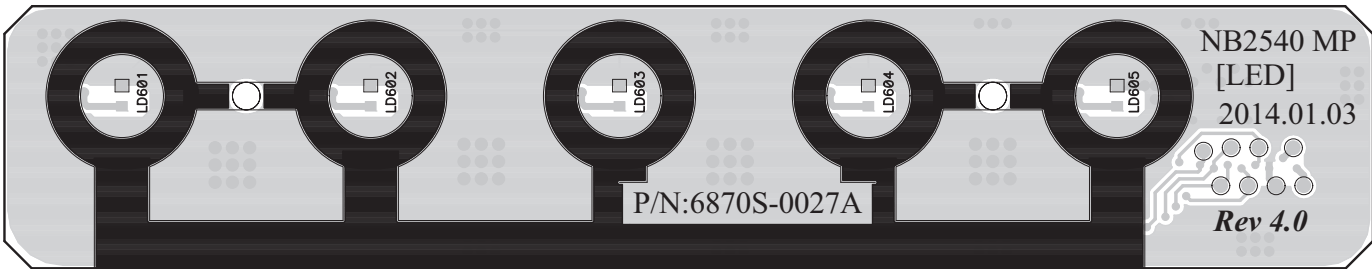
(BOTTOM VIEW)



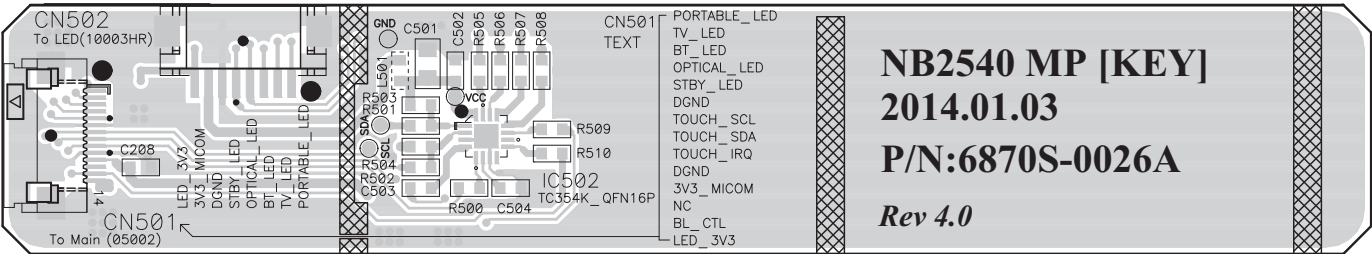
4. LED P. C. BOARD
(TOP VIEW)



(BOTTOM VIEW)



5. KEY P. C. BOARD
(TOP VIEW)



(BOTTOM VIEW)

